EXABYTE VXA-2 AUTOPAK1X7 AUTOLOADER

PRODUCT MANUAL

1010964-000

Exabyte

PART NUMBER 1010964-000

REVISION HISTORY

Revision	Date	Description
000	October 2002	Initial release

NOTE: The most current information about this product is available at Exabyte's World Wide Web site (www.exabyte.com).

PRODUCT WARRANTY CAUTION

The Exabyte VXA-2 AutoPak1x7 Autoloader is warranted to be free from defects in materials, parts, and workmanship and will conform to the current product specification upon delivery. For the specific details of your warranty, refer to your sales contract or contact the company from which you purchased the autoloader.

The warranty for the autoloader shall not apply to failures caused by:

- Physical abuse or use not consistent with the operating instructions or product specifications.
- Repair or modification by any one other than Exabyte's personnel or agent in a manner differing from the maintenance instructions provided by Exabyte.
- Removal of the Exabyte identification label(s).
- Physical abuse due to improper packaging of returned autoloader.

If problems with the autoloader occur, contact your maintenance organization; do not void the product warranty by allowing untrained or unauthorized personnel to attempt repairs.

Caution

Returning the autoloader in unauthorized packaging may damage the equipment and void the warranty. If you are returning the autoloader for repair, package it in its original packaging (or in replacement packaging obtained from your vendor).

CONTACTING EXABYTE

To obtain general information	
Exabyte Corporate Headquarters	Exabyte Corporation 1685 38th Street Boulder, CO USA 80301
	(303) 442-4333
To obtain technical support	
Exabyte Technical Support	1-303-417-7792
	1-303-417-7190 (fax)
World Wide Web	www.exabyte.com
To order supplies and accessories	
Exabyte Sales Support	1-800-774-7172
	1-800-392-8273 (Exabyte Media)
To return equipment for service	
Exabyte Service	1-303-417-7791 (US)
	Teleplan-800-673-5719 (Canada)
	1-303-417-7199 (fax)

Note: If it is more convenient to your location, contact Exabyte Technical Support in Europe at the following numbers:

Phone: +31-30-254-8890
Fax: +31-30-258-1582

Contents

ABOUT THIS MANUAL

This manual describes how to install, configure, operate, maintain, and troubleshoot the Exabyte VXA-2 AutoPak1x7 Autoloader. It also provides autoloader specifications.

WHERE TO LOOK FOR INFORMATION

Installation

If you are performing first-time installation:

- Read Chapter 1 for an overview of the autoloader's features and components.
- Read Chapter 2 for installation instructions, including unpacking the autoloader, obtaining the necessary accessories, connecting the autoloader to a SCSI bus, and powering on the autoloader.
- Read Chapter 3 for configuration instructions, including how to use the operator panel to set autoloader options.

Operation

When you are ready to put the autoloader into operation:

- Read Chapter 4 to learn how to remove and replace the magazine, clean the tape drive, reset the autoloader, and view autoloader information.

Maintenance, Troubleshooting, and Service

If you need to perform basic autoloader maintenance, troubleshoot problems, or return the autoloader for service:

- Read Chapter 5 for maintenance information, including instructions for uploading new firmware and creating diagnostic listings.
- Read Chapter 6 for troubleshooting tips, definitions of autoloader error codes, and corrective actions for each error situation.
- Read Chapter 7 for packing and shipping instructions if you need to return the autoloader for service.

Specifications

To learn about specifications for the autoloader:

- Read Appendix A for physical, performance, reliability, power, environmental, and safety agency specifications.

RELATED PUBLICATIONS

The following publications provide additional information for the autoloader.

Exabyte VXA-2 Tape Drive

- *Exabyte VXA-2 SCSI Tape Drive Quick Start*, 1009540
- *Exabyte VXA-2 SCSI Tape Drive Product Manual*, 1009541
- *Exabyte VXA-2 SCSI Tape Drive SCSI Reference*, 1009566

STANDARDS

- *ANSI Small Computer System Interface* (SCSI-2), X3.131-1994
- *ANSI SCSI Parallel Interface-2 (SPI-2)*, X3T10/1142D, Rev. 11
- EIA *Rack Standards*, RS-310-B

CONVENTIONS USED IN THIS MANUAL

This manual uses the following conventions:

Enter Boxed text indicates keys on the operator panel.

NOTE: Notes provide additional information or suggestions about the topic or procedure being discussed.

! Important Read text marked by the "Important" icon for information that will help you complete a procedure or avoid extra steps.

Caution Read the text marked by the "CAUTION" icon for information you must know to avoid damaging the autoloader, the tape drive, or losing data.

Warning Read the text marked by the "WARNING" icon for information you must know to avoid personal injury.

1

PRODUCT OVERVIEW

Congratulations on selecting the Exabyte® VXA-2 AutoPak1x7 Autoloader with the Exabyte VXA-2 tape drive.

The VXA-2 AutoPak1x7 Autoloader (AutoPak1x7) is the ideal first step into automated data storage, providing affordable, convenient automated backup and restore for small- to medium-sized office environments. Occupying just 1 cubic foot of space, the AutoPak1x7 is optimized for desktop applications. Easy to operate and designed to be compatible with all major software applications, the AutoPak1x7 requires virtually no IS administration.

The AutoPak1x7 can store up to 1.1 terabytes (TB) of information on 7 data cartridges, and can achieve a data transfer rate of up to 43.2 gigabytes per hour (GB/hour), assuming a data compression ratio of 2:1.

This chapter provides an overview of the AutoPak1x7's features and components.

AUTOLOADER FEATURES

The AutoPak1x7 includes the following features:

- **Removable cartridge magazine.** The autoloader includes a removable magazine containing seven storage slots. The magazine is easily accessible from the front of the autoloader.
- **Operator panel with LCD display.** The operator panel allows you to monitor autoloader operations, select configuration options, and control the robot.
- **Robotic cartridge handler (robot).** The robot moves cartridges between storage slots and the tape drive.
- **Wide, low-voltage differential (LVD) SCSI interface.** The autoloader and tape drive each support independent sets of SCSI messages and commands and can be connected to an LVD SCSI bus.
- **Tabletop or rack-mount configuration.** The autoloader is designed as a tabletop unit, but can also be mounted in a standard 19-inch rack. If desired, you can mount two autoloaders side-by-side on a single rack shelf. Rack-mounting kits are available from Exabyte.

AUTOLOADER COMPONENTS

The following sections describe the autoloader's front panel, internal, and back panel components.

FRONT PANEL COMPONENTS

Figure 1-1 shows the autoloader's front panel components.

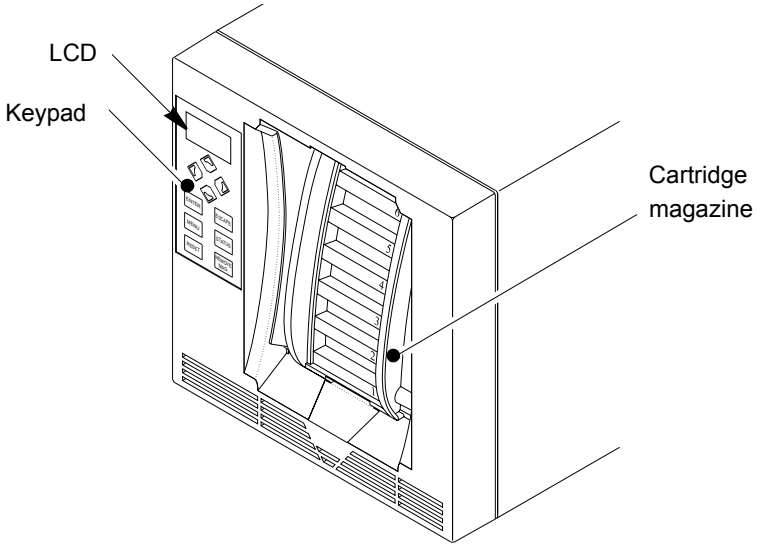


Figure 1-1 *Front panel components*

- **LCD and keypad (operator panel).** The two-line LCD (liquid crystal display) and keypad allow you to view the operational status of the autoloader, access a menu of operations, and view status messages.
- **Cartridge magazine.** The autoloader includes one removable magazine that stores up to seven cartridges.

INTERNAL COMPONENTS

Figure 1-2 shows the autoloader's internal components.

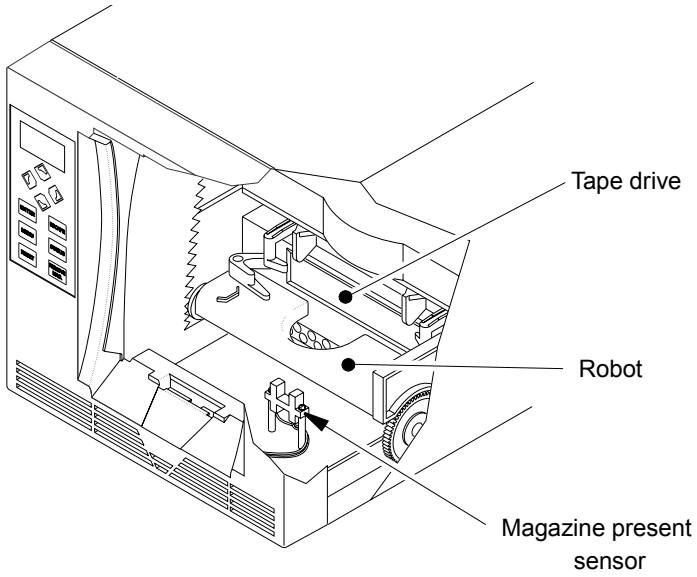


Figure 1-2 *Internal components*

- **Robot.** The robot moves a cartridge between the magazine and the tape drive.
- **Magazine present sensor.** The magazine present sensor detects whether the cartridge magazine is installed.
- **Tape drive.** The autoloader contains one tape drive.

BACK PANEL COMPONENTS

Figure 1-3 shows the autoloader's back panel components.

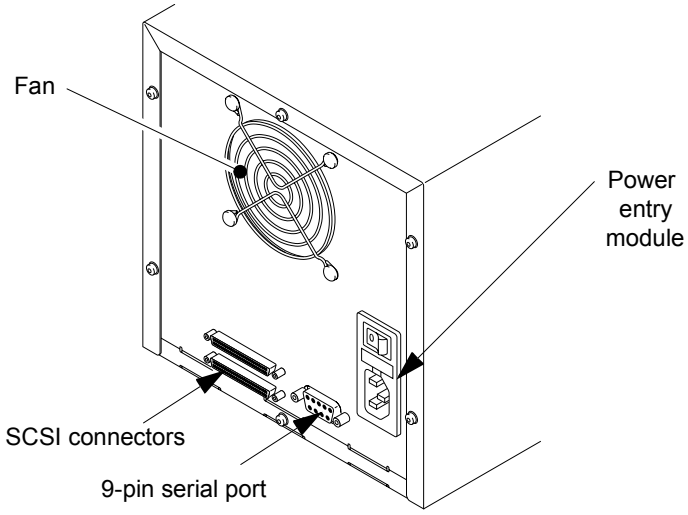


Figure 1-3 *Back panel components*

- **Fan**. The fan reduces the autoloader's operating temperature.
- **Power entry module.** The power entry module includes the AC power connector and the power switch.
- **9-pin serial port.** The serial port allows you to connect a serial cable to the autoloader and use a terminal emulation program to perform diagnostics.
- **SCSI connectors.** The two wide SCSI connectors allow you to connect the autoloader to a wide SCSI bus.

Notes

2

HARDWARE INSTALLATION

This chapter describes how to install the autoloader. Installation involves the following steps:

- Unpacking the autoloader
- Obtaining accessories and equipment
- Preparing for installation
- Preparing and installing cartridges
- Connecting the autoloader to the SCSI bus
- Powering on the autoloader
- Verifying the hardware installation

UNPACKING THE AUTOLOADER

To unpack the autoloader, remove the packing material and lift the autoloader out of the box.

Note: Save all the original packing materials, including the accessory box, in case you need to ship or move the autoloader later.

To remove the shipping braces:

1. Remove the magazine by grasping it at the top (near cartridge slot 7) and pulling out, as shown in Figure 2-1.

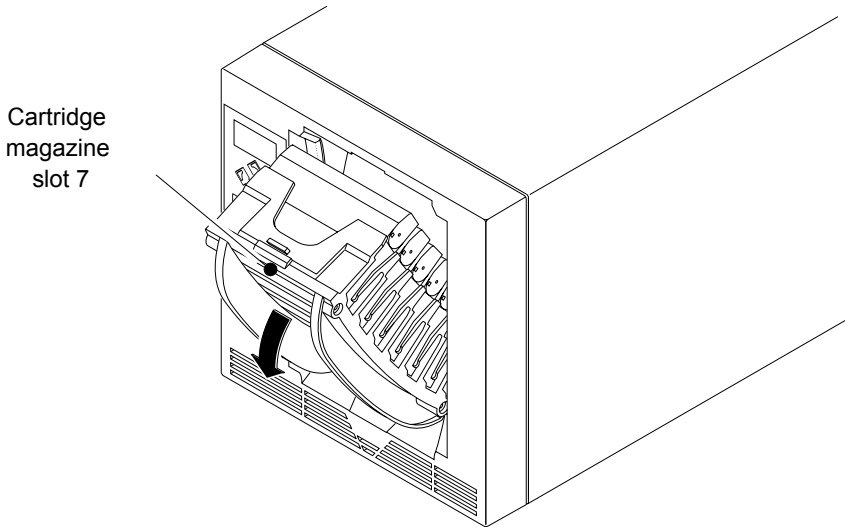


Figure 2-1 *Removing the cartridge magazine*

2. Remove the shipping braces as follows:

   a. Grasp the cross-brace and disengage it from one side support. Then remove it from the autoloader, as shown in Figure 2-2.

b. Pull both of the side supports out of the autoloader.

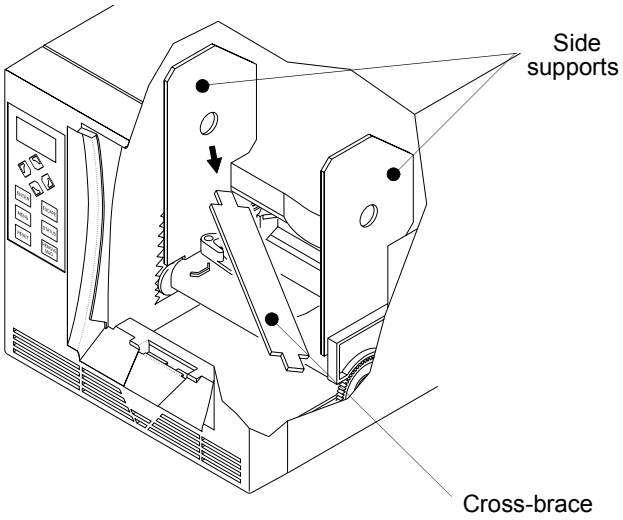


Figure 2-2 *Removing the shipping braces*

OBTAINING ACCESSORIES AND EQUIPMENT

Make certain you have all the accessories and equipment required for autoloader installation and operation, as indicated in Table 2-1. Many of these items are included in the autoloader's accessory box. If necessary, you can purchase these items from Exabyte (see "Contacting Exabyte" on page iv)

Table 2-1 *Accessories and equipment for installation and operations*

Accessories and Equipment	
Power cord	Two power cords are provided with the autoloader: One for use in the US and Canada and one for use in Europe. If you plan to use the autoloader outside of these locations, refer to page 84 for power cord requirements.
Cartridge magazine	One cartridge magazine is included with the autoloader.
Cartridges	One or more data cartridges and a cleaning cartridge may be included with the autoloader. You can purchase data cartridges and cleaning cartridges from Exabyte. **Caution** The VXA-2 tape drive operates with VXAtape cartridges only. Do not attempt to use other types of data or cleaning cartridges, or you may damage the tape drive.
SCSI cables	One wide, multi-mode (single-ended/LVD) SCSI cable may be included with the autoloader. You can purchase additional cables from Exabyte or provide your own. Follow these guidelines when selecting SCSI cables: ▪ Use wide LVD SCSI cables that conform to SCSI-3 specifications. To comply with the regulations and standards listed in Appendix A, all SCSI cables used with the autoloader must be properly shielded. ▪ The maximum allowable length of an LVD SCSI bus is 12 meters (39 feet) if you have more than two devices on the bus. To determine the bus length, add together the lengths of all external SCSI cables. Add 0.7 meters (27.2 inches) for the internal cable length used by the autoloader. Add the internal cable lengths for any other SCSI devices on the bus.
SCSI terminators	One wide, multi-mode (single-ended/LVD) SCSI terminator may be included with the autoloader. You can purchase terminators from Exabyte or provide your own. If you want to use your own terminator, use an active terminator such as the AMP 796051-1 (SE/LVD Multi-mode) SCSI terminator. Termination must be external; do not use an internal terminator.

Table 2-1 *Accessories and equipment for installation and operations (continued)*

Accessories and Equipment	
Rack-mount hardware (optional)	If you want to install the autoloader in a rack, contact Exabyte for the required kit.
Serial cable	If you want to connect to the autoloader's Console interface for firmware upgrades and diagnostics, use a straight-through 9-pin serial cable (not a null modem cable).

PREPARING FOR INSTALLATION

Before you begin installing the autoloader, do the following:

- **Make sure that the SCSI host bus adapter card installed in the host computer and your backup software are compatible with the Exabyte VXA-2 AutoPak1x7 Autoloader.** Contact Exabyte Technical Support or your sales representative for the latest compatibility information. If your software application has not yet been certified for the AutoPak1x7 or Exabyte EZ17 autoloader, you can use the autoloader's emulation mode (see page 24). If your software only supports the tape drive and not the autoloader, you can run the autoloader in Sequential mode (see page 41). You can install the software on the host computer before or after autoloader installation. However, if you install the software first, you may need to reconfigure it for use with the autoloader after autoloader installation is complete.

- **Locate an appropriate area for the autoloader.** There must be approximately 15 cm (6 inches) of open area behind the autoloader for adequate air flow.

- **Ensure that the work area is free from conditions that could cause electrostatic discharge (ESD).** Discharge static electricity from your body by touching a known grounded surface, such as a computer's metal chassis.

Warning

Before performing any installation or maintenance procedures, be sure that the autoloader's power switch is in the off position and the power cord is disconnected from the autoloader and the outlet.

- **Install the autoloader in a rack, if desired.** As an option, you can install the autoloader into a rack. Contact Exabyte (see page iv) for the rack-mount kit, which includes hardware and installation instructions.

PREPARING AND INSTALLING CARTRIDGES

This section describes how to prepare cartridges and install them in the autoloader.

1. Verify that the write-protect switch on each cartridge is set correctly, as shown in Figure 2-3. You can use a ball-point pen or similar instrument to set the write-protect switch.

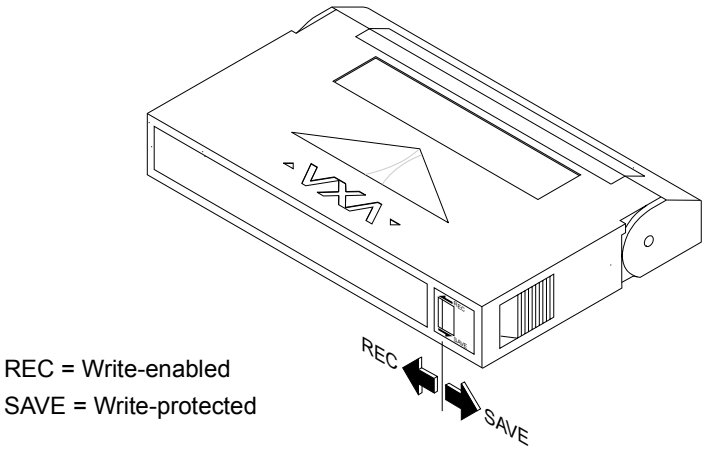


Figure 2-3 *Setting the write-protect switch*

2. Remove the magazine as described on page 8, if necessary.

3. Place the magazine on its back with the cartridge slots facing up. Orient the cartridges as shown in Figure 2-4.

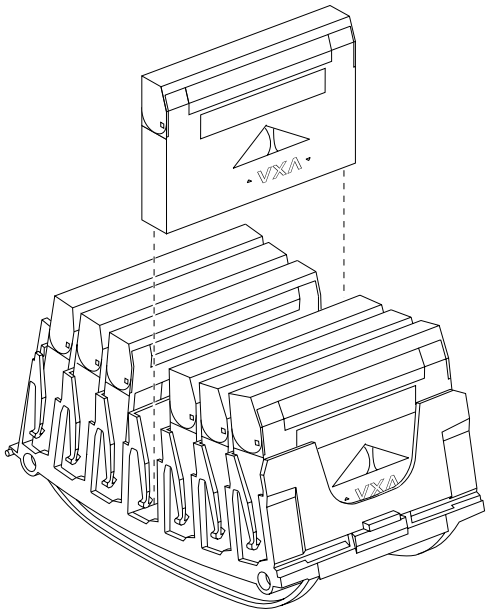


Figure 2-4 *Installing cartridges in the magazine*

4. Insert cartridges into each slot.

Caution

Avoid touching or opening the cartridge dust cover when handling the cartridges.

Make sure the cartridge is inserted as shown in Figure 2-4, or you may damage the magazine when you place it into the autoloader.

5. Position the magazine so the bottom mounting guide on the magazine (near cartridge slot 1) aligns with the slot in the bottom of the opening in the autoloader.

6. Push the top of the magazine in toward the autoloader until it snaps into place, as shown in Figure 2-5.

Caution

Do not force the magazine into the autoloader. Forcing the magazine may break the cartridge slot fingers.

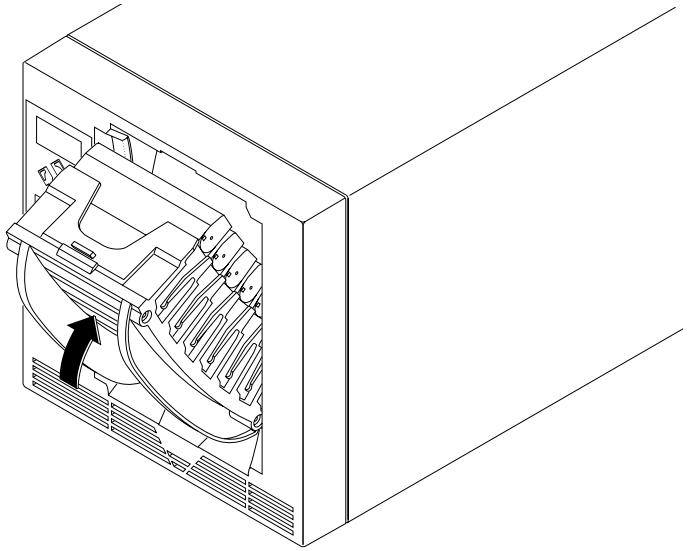


Figure 2-5 *Inserting the cartridge magazine*

CONNECTING THE AUTOLOADER TO THE SCSI BUS

This section provides general guidelines for connecting the autoloader to the SCSI bus. The autoloader and tape drive operate as two LVD SCSI devices on one wide LVD SCSI bus.

Caution The autoloader and tape drive are LVD SCSI. Do not connect the autoloader to a high-voltage differential (HVD) SCSI bus. Doing so may cause damage to the autoloader, tape drive, or other devices on the bus.

! Important Although LVD SCSI is compatible with single-ended SCSI, Exabyte does not support single-ended devices on the autoloader's LVD SCSI bus.

To connect the autoloader to the SCSI bus:

1. Power off the host computer and any peripheral devices on the SCSI bus.
2. Connect the host computer's SCSI cable to one of the SCSI connectors on the back of the autoloader.
3. If the autoloader is the last device on the SCSI bus, install a terminator on the unused connector, as shown in Figure 2-6.

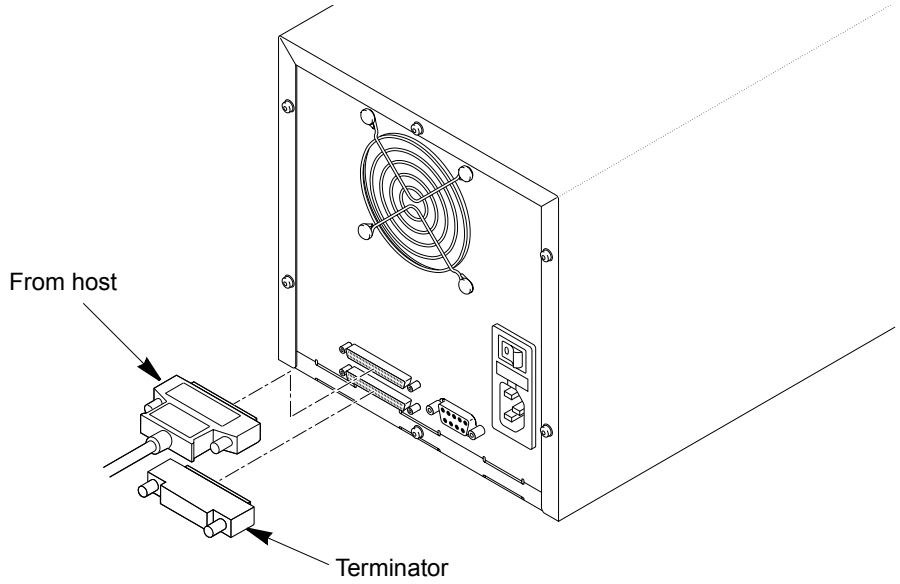


Figure 2-6 *Connecting the autoloader to the SCSI bus (autoloader terminates the bus)*

4. If the autoloader is not the last device on the bus, connect a SCSI cable from the unused SCSI connector to the next device on the bus, as shown in Figure 2-7.

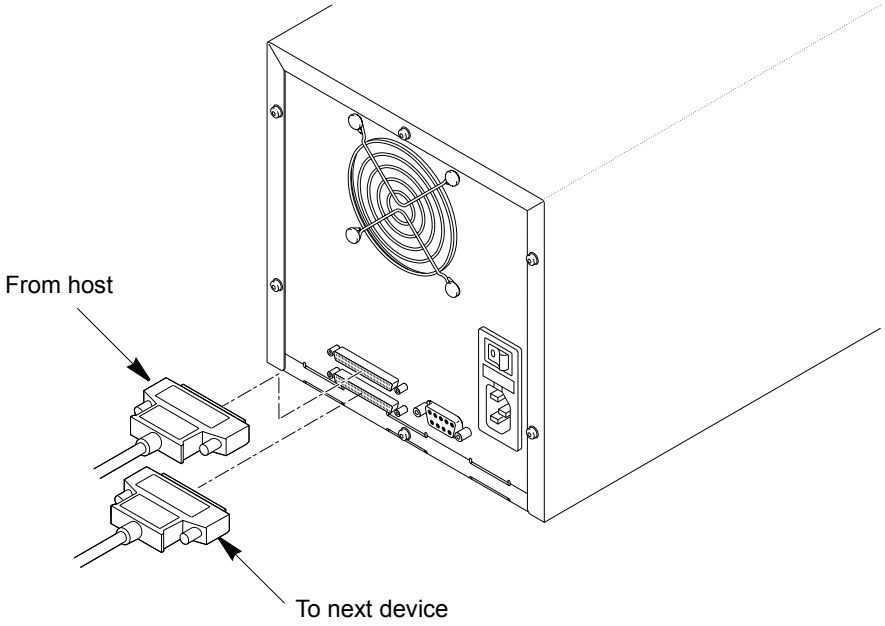


Figure 2-7 *Connecting the autoloader to the SCSI bus (autoloader does not terminate the bus)*

POWERING ON THE AUTOLOADER

1. Make sure that the power switch on the back of the autoloader is off (the **0** is pressed).

2. Connect the female end of the power cord to the power connector on the back of the autoloader (see Figure 2-8).

! Important Two power cords are shipped with the autoloader: One for use in the US and Canada, and one for use in Europe. Use the correct power cord for your location. See page 84 for power cord requirements for other locations.

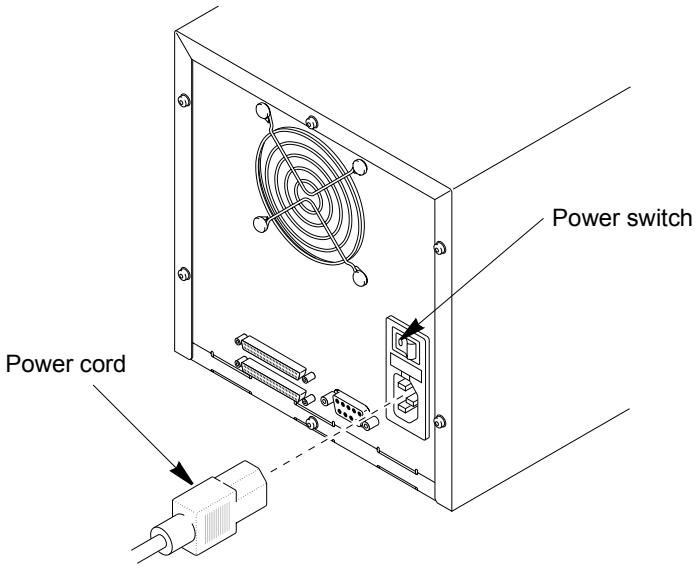


Figure 2-8 *Connecting the autoloader's power cord*

3. Plug the male end of the power cord into the power source.

   Note: The autoloader has autoranging voltage selection, so you do not need to change the voltage setting.

4. Push the power switch on the back of the autoloader to the on position (the **I** is pressed). Wait while the autoloader performs its power-on sequence. During this time, the following activities occur:

   - The cooling fan begins to rotate.
   - The LCD illuminates and displays the initialization sequence.
   - The drive and the autoloader perform their power-on self-tests.
   - The LCD displays the Status screen.

5. Power on the host computer system.

VERIFYING THE HARDWARE INSTALLATION

If the autoloader does not power on as described, check the following:

- Is the power switch on?
- Is the power cord inserted correctly?
- Is the SCSI bus terminated?
- Is the SCSI cable firmly connected to the autoloader and host computer?
- Is the host computer system powered on?
- Is the SCSI cable connected to the autoloader and host computer?
- Is there an error code displayed on the autoloader LCD? (See Chapter 6.)

If you cannot resolve the problem yourself, contact Exabyte Technical Support (see page iv).

3

CONFIGURING THE AUTOLOADER

After installing the autoloader, you are ready to set basic configuration options. This chapter describes how to:

- Access configuration options through the operator panel
- Set configuration options
- Check the setup

USING THE OPERATOR PANEL

The autoloader includes an operator panel consisting of a two-line LCD and a keypad (shown in Figure 3-1). The operator panel allows you to interactively control autoloader operations. You can set autoloader options, check operating statistics, and exercise autoloader hardware.

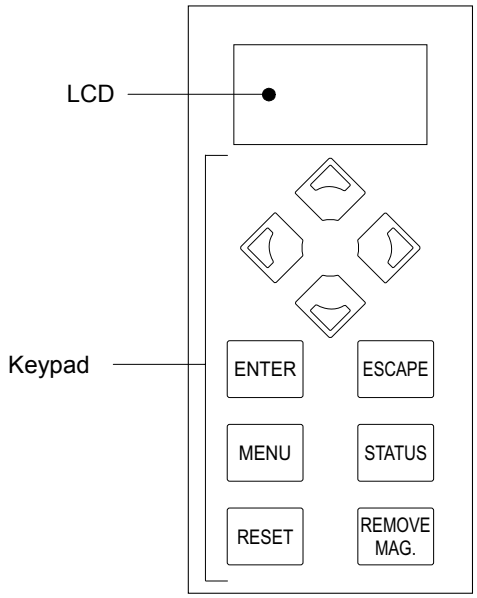


Figure 3-1 *Operator panel*

STATUS SCREEN

The Status screen appears when you power on the autoloader. The first line of the Status screen displays high-level autoloader status. If there is no high-level status to report, the first line displays the product name. The second line displays low-level autoloader status. If there is no low-level status to report, the second line displays the tape drive's status.

An example of the Status screen with a status message "Drive Ready, No Tape" is shown below.

```
AutoPak
DRdyNoTp
```

Note: The exact wording of your Status screen may be different.

If a hardware error occurs, an error code and a brief description appears automatically on the Status screen. You must correct the error before operation can continue. (Refer to Chapter 6 for help in diagnosing and correcting errors.)

USING THE OPERATOR KEYS

Use the keys on the operator panel to perform the operations described in Table 3-1.

Table 3-1 *Operator panel keys*

Keys	Operations
↑ ↓	Scrolls up or down through the menus or increases or decreases option values.
← →	Shifts the screen arrow left or right one digit when changing SCSI IDs, password, number of moves, and so on.
REMOVE MAG	Requests motion to stop and releases the solenoid so you can remove the magazine. **Note:** The robot parks in front of the drive. If you want to access the drive, use the Park & Unlock command from the Main Menu.
ESCAPE	Goes up one level from the current menu option, cancels changes, and stops tests and demonstrations that were started through the Command Menu or Demo Menu.
ENTER	Selects the menu (goes down one level) or confirms a parameter change or selection.
RESET	Resets the autoloader (requires confirmation). **Note:** To reset the drive, power cycle the autoloader.
MENU	Goes directly to the top of the Main Menu (to the Security Menu).
STATUS	Goes directly to the Status screen. The Status screen is the default after a reset.

USING THE MENUS

To access the Main Menu, press MENU. Then, press ↑ or ↓ repeatedly to loop through the menus and return to where you started.

Menus with ▸ are menus that have changeable options. Menus with ■ are menus that only have viewable information. Press ENTER to view the options or information available from the menu you want.

The menu structure is shown in Figure 3-2.

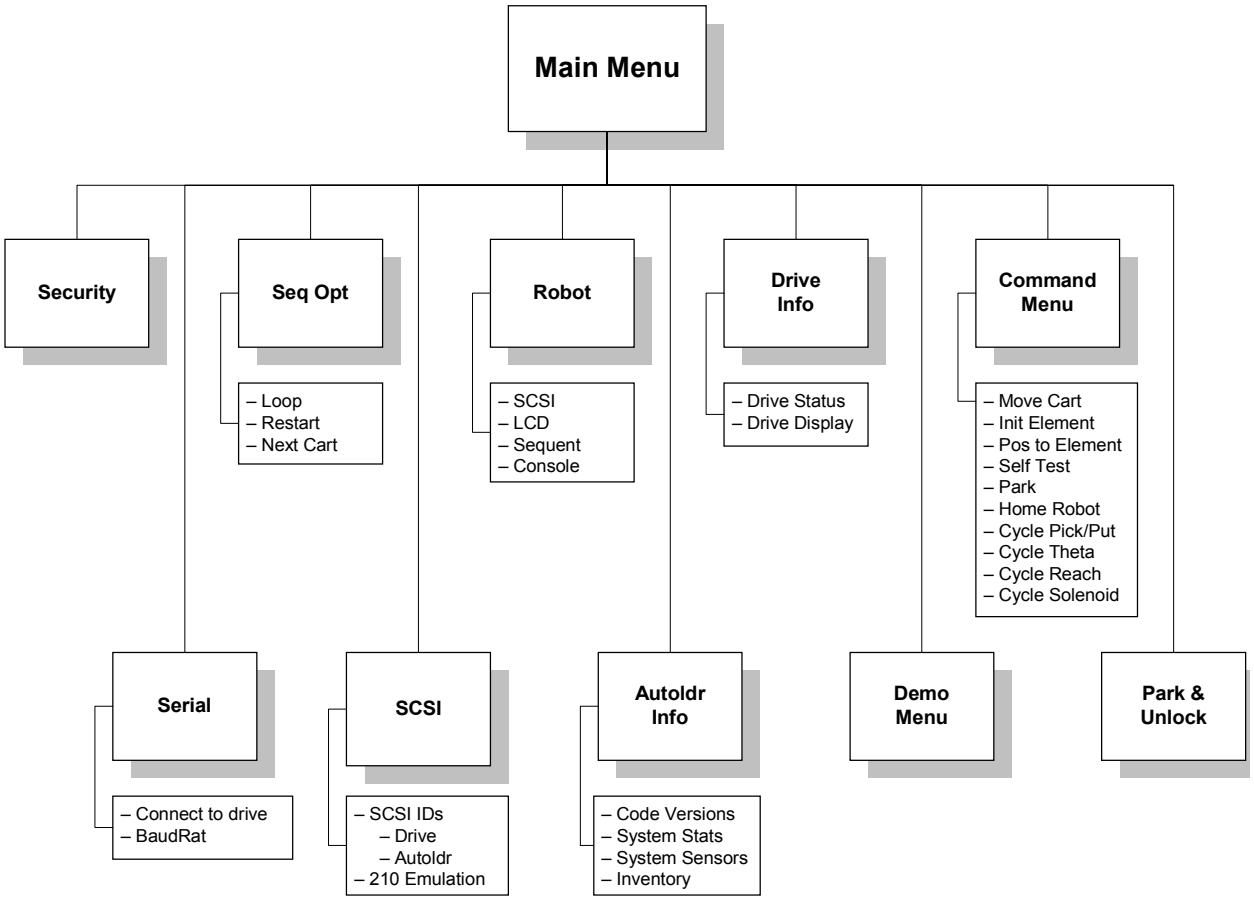


Figure 3-2 *Autoloader menu organization*

Table 3-2 provides an overview of the autoloader's main menus

Table 3-2 *Main menus available from the operator panel*

Menu	Description
Securty (Security)	Allows you to set LCD security. Shows if security is disabled. If security is enabled, shows the method that was used to set security (LCD or SCSI).
Robot (Robot Control Mode)	Allows you to specify how robot motion is controlled and shows the current robot control mode. The robot control modes are SCSI, Sequential, LCD, and Console.
SCSI	Allows you to set SCSI IDs for the autoloader and drive, allows you to set Exabyte 210 emulation, and shows the current settings.

Table 3-2 *Main menus available from the operator panel (continued)*

Menu	Description
Seq Opt (Sequential Options)	Allows you to set Loop, Restart, and Next Cart to 1, and shows the current settings.
Serial	Allows you to set the baud rate of the autoloader's serial port.
Autoldr Info (Autoloader Information)	Allows you to view the code versions, system statistics, system sensors, and inventory.
Drive Info	Shows drive status, drive error messages, and tape motion information.
Demo Menu	Provides options for running the autoloader in a continuous demonstration mode, where the robot randomly moves cartridges.
Command Menu	Allows you to perform specific robot movements and tests.
Park & Unlock	Allows you to park the robot at the top of its theta axis (the arced path the robot travels to access cartridges) and release the magazine's solenoid (the magazine's locking mechanism).

SETTING CONFIGURATION OPTIONS

Configuring the autoloader involves setting options based on your specific needs. Configuration tasks include:

- Setting the SCSI IDs
- Setting the emulation mode, if necessary
- Setting Sequential mode options, if necessary
- Setting the robot control mode
- Setting the LCD security option

The following sections provide step-by-step instructions for each of these tasks.

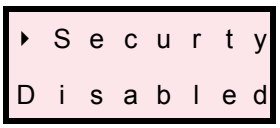
SETTING THE SCSI IDS

Default SCSI IDs are assigned at the factory for the autoloader and the drive. This section describes how to view the default settings and change them if necessary.

! Important The autoloader and drive must each have a unique SCSI ID.

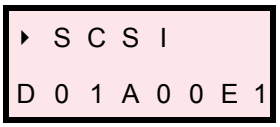
To view or change the SCSI IDs:

1. Press MENU. The following screen appears:



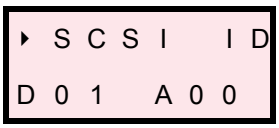
Note: If security is enabled, the second line of the LCD displays `LCD PW` or `SCSI` (depending on what mode was used to set security). If necessary, disable LCD security, as described on page 31.

2. Press ↑ or ↓ to scroll through the Main Menu until you see the following screen:

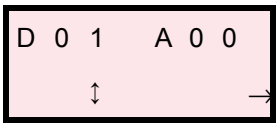


- D01– the current SCSI ID of the tape drive
- A00– the current SCSI ID of the autoloader
- E1– 210 emulation is on (1) or off (0)

3. Press ENTER. The following screen appears:



4. If you want to change the current settings, press ENTER. The message `Set SCSI IDs` flashes on the screen, then the following screen appears:



5. To change the drive's SCSI ID, press ↑ or ↓ until you see the ID you want. Or, if you only want to change the autoloader's SCSI ID, press →. The screen arrow moves to the far right digit in the autoloader's SCSI ID.

   Note: Certain software applications require the autoloader SCSI ID to be set one digit lower than the drive SCSI ID. Refer to the documentation for your software application for more information.

6. Press ↑ or ↓ until you see the SCSI ID you want for the autoloader.

7. Press ENTER. If you changed the SCSI ID for the drive, the following message flashes on the screen:

   ```
   Power cycle the autoloader to change the drive SCSI ID
   or press ESCAPE to cancel
   ```

   To keep the SCSI ID you set, power the autoloader off and back on. If you do not want to keep the tape drive SCSI ID, press ESCAPE.

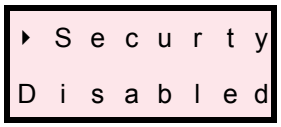
   Note: You do not need to power cycle the autoloader if you only changed the autoloader's SCSI ID.

SETTING THE EMULATION MODE

If your software has not yet been certified for the AutoPak1x7 or Exabyte EZ17 autoloader, you can select an option that allows the autoloader to emulate an Exabyte 210 library. Changing the emulation mode causes the autoloader to return "EXB-210" in response to a SCSI INQUIRY command from an application. Because most applications are certified for the Exabyte 210 library, changing the emulation mode allows these applications to support the AutoPak1x7.

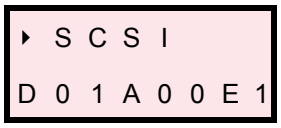
To set the autoloader to Exabyte 210 emulation mode:

1. Press MENU. The following screen appears:



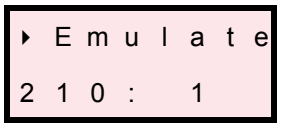
2. Disable LCD security, as described on page 31, if it is enabled.

3. Press ↑ or ↓ to scroll through the Main Menu until you see the following screen:

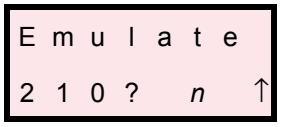


   The "E" indicates whether 210 emulation is on (1) or off (0).

4. If you want to change the 210 emulation setting, press ENTER to view the options in the SCSI Menu. Press ↑ or ↓ until the following screen appears:



5. Press ENTER to view the emulation options. The following screen appears (*n* is either 0 or 1):



6. Press ↑ or ↓ until you see the setting you want. If you want 210 emulation on, press ENTER when the LCD displays `1`. If you want 210 emulation off, press ENTER when the LCD displays `0`.

SETTING SEQUENTIAL MODE OPTIONS

When the autoloader is operating in Sequential mode, its internal firmware instructs the robot to move cartridges sequentially between the cartridge slots and the tape drive. No application software is required to support cartridge movement.

Sequential operation occurs as follows: The robot picks the cartridge from slot 1 and places it in the tape drive. The robot waits until the tape drive ejects the cartridge, then returns the cartridge to its original slot. The robot repeats these steps for the next cartridge until it has processed all of the cartridges in the magazine. The robot either returns to the first cartridge and begins the process again or stops, depending on the setting of the Loop option (described in Table 3-3).

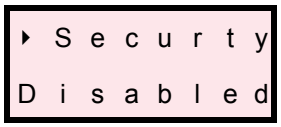
To customize how Sequential mode works, you can set the Loop, Restart, and Next Cart options. These options are not affected by a reset or power cycle. Table 3-3 describes the sequential mode options.

Table 3-3 *Sequential mode options*

Option	Description
Loop	The Loop option determines what the autoloader does after it has finished processing the last cartridge in the magazine. The settings for the Loop option are as follows: **On** – The autoloader returns to cartridge 1 and starts processing the cartridges again. **Off** – The autoloader stops processing cartridges and waits for operator intervention. (Operator intervention typically means removing the autoloader's magazine, replacing cartridges, and re-inserting the magazine.)
Restart	The Restart option determines where the autoloader restarts after it is reset or power-cycled, or after the magazine is removed and replaced. The settings for the Restart option are as follows: **On** – The autoloader restarts at slot 1. **Off** – The autoloader resumes where it left off. Before the autoloader restarts, the following actions occur: ▪ The autoloader performs a power-on self-test (POST). ▪ If the robot was moving a cartridge, it finishes the move. (This includes inserting the cartridge into the drive if the robot was moving a cartridge to the drive.) **Note:** If you attempted to remove the magazine, the autoloader does not release the magazine's solenoid until it has completed the move. ▪ If a cartridge was in the drive, the robot waits for the drive to eject the cartridge, then reseats the cartridge in the drive. The robot then checks for cartridges in the magazine and returns the cartridge to its original slot.
Next Cart	The Next Cart option allows you to interrupt sequential processing and specify that the next cartridge the autoloader selects is the cartridge in slot 1. Whenever you want to resume sequential processing from the first cartridge, select Next Cart from the Sequential Options Menu.

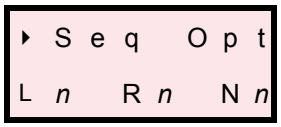
To set the Sequential mode options:

1. From the Status screen, press MENU. The following screen appears:



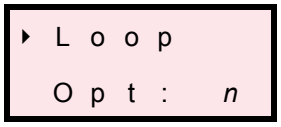
2. Disable LCD security if it is enabled, as described on page 31.

3. Press ↑ or ↓ to scroll through the Main Menu until you see the Sequential Options screen:

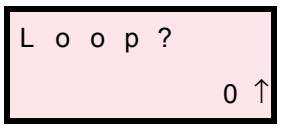


In the example above, each *n* has the value described below:
L – Loop option: *n* = 1 (on) or 0 (off).
R – Restart option: *n* = 1 (on) or 0 (off).
N – the next cartridge to be processed: *n* = 1 to 7.

4. Press ENTER. The Loop Option screen appears:

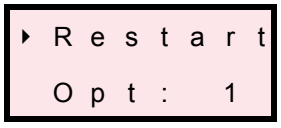


5. Press ENTER to display the screen for changing the Loop option:

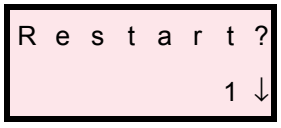


6. Press ↑ or ↓ until you see the setting you want. If you want Loop on, press ENTER when the LCD displays `1`. If you want Loop off, press ENTER when the LCD displays `0`. The Loop Option screen shows the new setting.

7. Press ENTER to display the Restart Option screen:

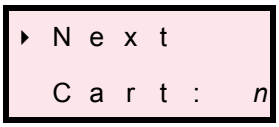


8. Press ENTER to display the screen for changing the Restart option:



9. Press ↑ or ↓ until you see the setting you want. If you want Restart on, press ENTER when the LCD displays `1`. If you want Restart off, press ENTER when the LCD displays `0`. The Restart Option screen shows the new setting.

10. Press ENTER to display the Next Cartridge screen:



In the example above, *n* is a number from 1 to 7.

If *n* is 1, the next cartridge the autoloader will process is the cartridge in slot 1. You do not need to modify this setting.

If *n* is a number from 2 to 7 and you want the next cartridge the autoloader processes to be the cartridge in slot 1, press ENTER. The following message flashes on the screen:

```
Press ENTER to set next cart to 1 or ESCAPE to cancel
```

11. Press ENTER again to set the next cartridge to 1.

12. Press ESCAPE to return to the Sequential Options screen.

Although the autoloader has effective methods for resuming operation, it is best to avoid interruptions when the autoloader is operating in Sequential mode. In particular:

- **Do not reset or power cycle the autoloader unless absolutely necessary**. Reset the autoloader only to clear certain autoloader error conditions and power off the autoloader only to perform maintenance or to store it. Avoid resetting or power cycling the autoloader when a cartridge is in the drive or the robot.

- **Do not remove the magazine unless absolutely necessary**. During operation, remove the magazine only after the autoloader has processed all the cartridges. Never force the magazine. The autoloader will not release the magazine until it has completed a cartridge move or load already in progress. Certain applications may also prevent the magazine from being removed.

- **Do not remove a cartridge from the drive or insert a cartridge into the drive**. If you want to remove a cartridge, wait until the robot has placed it in the magazine before removing it. If you want to add a cartridge, add it directly to the magazine.

SETTING THE ROBOT CONTROL MODE

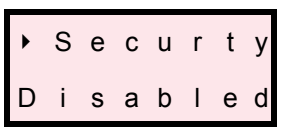
The robot control mode determines the source of commands issued to the robot to move cartridges. The available control modes are described in Table 3-4. After you select a control mode, it remains in effect until you change it. Cycling the power or resetting the autoloader does not change the control mode.

Table 3-4 *Robot control modes*

Control mode	Description
SCSI	If you want the application software to control autoloader operations, you must set the autoloader to SCSI mode. In this standard operating mode, the application software controls the motion of the robot by issuing SCSI commands across the SCSI bus. **Note:** The application software can issue commands to the autoloader regardless of the robot control mode. However, the autoloader must be in SCSI mode for the application software to control the robot's motion.
Sequential	If you want the autoloader to run as a sequential stacker device, you need to set the autoloader to Sequential mode. In this mode, the application software does not need to provide support for autoloader functions, only for the drive. For detailed information about using Sequential mode, see page 41.
LCD	If you want to perform operations from the operator panel that involve moving the robot or connecting the serial port to the drive, you need to set the autoloader to LCD mode. These operations, such as exercising the autoloader's components, and communicating with the drive over the serial port, are included under the Command Menu, the Demo Menu, or the Serial Menu.
Console	When the autoloader is operating in Console mode, you can upload new firmware, perform a diagnostic listing, and view the LCD password. Your host must have a remote terminal emulation program and be connected to the autoloader's 9-pin serial port. (See Chapter 5 for instructions.)

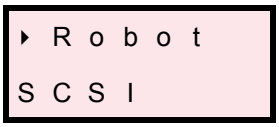
To change the robot control mode:

1. Press MENU. The following screen appears:



2. Disable LCD security, as described on page 31, if it is enabled.

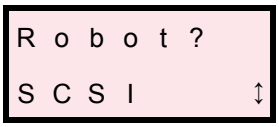
3. Press ↑ or ↓ to scroll through the Main Menu until you see the following screen:



4. Press ENTER. The following message flashes on the screen:

```
Select I/F that controls robotic motions
```

Then, the following screen appears:



! Important If you select Sequential mode, you need to set Sequential mode options (see page 41 for instructions). If you select Console mode, you need to set the autoloader's baud rate to match the host computer's baud rate (see page 55 for instructions).

5. Press ↑ or ↓ until you see the control mode you want and press ENTER to select it.

SETTING THE LCD SECURITY OPTION

The Security option allows you to prevent unauthorized personnel from disrupting the operation of the autoloader. When you enable security, the following activities are prevented:

- Changing SCSI IDs
- Changing the robot control mode
- Changing 210 emulation
- Unlocking and removing the magazine
- Using the Command Menu and Demo Menu
- Connecting the serial port to the drive
- Changing Sequential mode options

If you attempt to perform any of the previous operations when security is enabled, the autoloader displays a message indicating that security is active. The message also indicates whether security was enabled from the LCD or by the application software with a SCSI command.

You can set security in either of two ways:

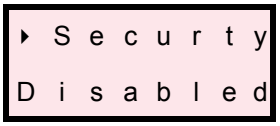
- You can set the security option from the LCD, as described in this section.
- The application software can issue a SCSI MODE SELECT command to enable or disable security (see your software documentation).

Whichever method you use to enable security (LCD or SCSI), you must also use it to disable security. That is, if you enable security from the LCD, you must disable it from the LCD.

Note: The security setting is unaffected by cycling the power or resetting the autoloader.

Enabling Security From the LCD

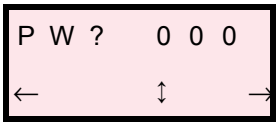
1. From the Status screen, press MENU. The following screen appears:



2. Disable LCD security, as described on page 31, if it is enabled.
3. Press ENTER to display the Security Menu. The following message flashes on the screen:

   ```
   Select password and press ENTER to enable security or
   ESCAPE to cancel
   ```

   Then, the following screen appears:



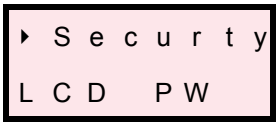
4. Select a three-digit password. Press ← or → to move the screen arrow under the digit in the password that you want to change and ↑ or ↓ to change the number. (The default password is 000.) When you are finished, press ENTER.

! Important You must use the same password to disable security.

5. A confirmation message appears. Press ENTER to accept the password and enable security. Or, to exit without saving the password and without enabling security, press ESCAPE.

Disabling Security From the LCD

1. From the Status screen, press MENU. The following screen appears:

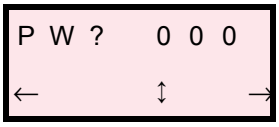


Note: If the menu displays `Disabled`, the security option is already disabled. If the menu displays `LCD PW`, security was enabled using the LCD as described in the following steps. If the menu displays `SCSI`, security was enabled by your application using a SCSI command. If a SCSI command was used to enable security, it must be used to disable security. Refer to your software documentation for instructions.

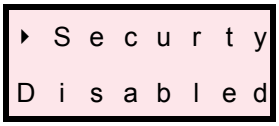
2. Press ENTER to enter the Security Menu. The following message flashes on the screen:

```
Enter password and press ENTER to disable security or
ESCAPE to cancel
```

Then, the following screen appears:



3. Enter the three-digit password you selected when you set security. Press ← or → to move the screen arrow under the digit in the password that you want to change and ↑ or ↓ to change the numbers. (The default password is 000.) When you are finished, press ENTER. The following screen appears:



If you enter the wrong password, the system displays an error message.

Note: If you forget the password, try entering the default password (000). If the password has been changed from the default and you do not know what it is, see page 61 for instructions about how to view the LCD password.

CHECKING THE SETUP

After configuring the autoloader, check the setup by performing the suggested exercises below. While these exercises are not required, it is a good idea to verify that your software and hardware are properly communicating before you begin operations.

- Use the Demo Menu to exercise the hardware. This determines whether the autoloader hardware components are operating properly. See page 48 for more information.
- Use the application software to load and unload one or more cartridges into the drive. This determines whether the software, autoloader, and drive are communicating properly.
- Back up several megabytes of data and perform a comparison check on the backed up data. This determines whether the software and drive are communicating properly.

If the autoloader and drive are not operating as expected, see Chapter 6 for troubleshooting information. If there is an error code displayed on the LCD, see page 67 for a list of error codes and corrective actions. If you cannot solve the problem yourself, contact your service provider or Exabyte (see page iv).

4

OPERATING THE AUTOLOADER

After you have configured the autoloader, you can put it into operation. Your autoloader application automatically controls the autoloader's robotics (unless you are using Sequential mode), while your backup application controls backup and restore jobs.

Before beginning operation, always make sure that:

- The tape drive does not have a cartridge loaded.
- The robot does not contain a cartridge.
- The cartridge magazine is installed.
- The autoloader is in the proper control mode. The standard operating mode is SCSI (see page 28).

During normal operation, you do not need to intervene in autoloader activities; however, you may occasionally need to perform the following tasks, described in this chapter:

- Remove and replace the magazine
- Clean the tape drive
- Eject a cartridge manually
- Monitor tape drive LEDs
- Reset the autoloader and tape drive
- View autoloader and tape drive information
- Perform hardware exercises
- Store cartridges that you have removed from the autoloader

REMOVING AND REPLACING THE MAGAZINE

This section describes removing and replacing the magazine to access the cartridges and the tape drive.

REMOVING THE MAGAZINE

To remove the magazine:

1. Release the magazine by pressing REMOVE MAG and following the instructions on the screen. When the autoloader finishes the current operation, it parks the robot in front of the drive and releases the magazine's solenoid.

   Note: Pressing REMOVE MAG parks the robot in front of the drive. If you want to access the drive, use the Park & Unlock command from the Main Menu.

2. Grasp the magazine at the top (near cartridge slot 7) and pull out, as shown in Figure 4-1.

Caution Do not force the magazine out of the autoloader. Doing so may damage the magazine or the robot.

If the magazine does not release easily, the autoloader's security setting may be turned on or the robot's gripper may be holding a cartridge. Check the security setting and disable security, if necessary (see page 31).

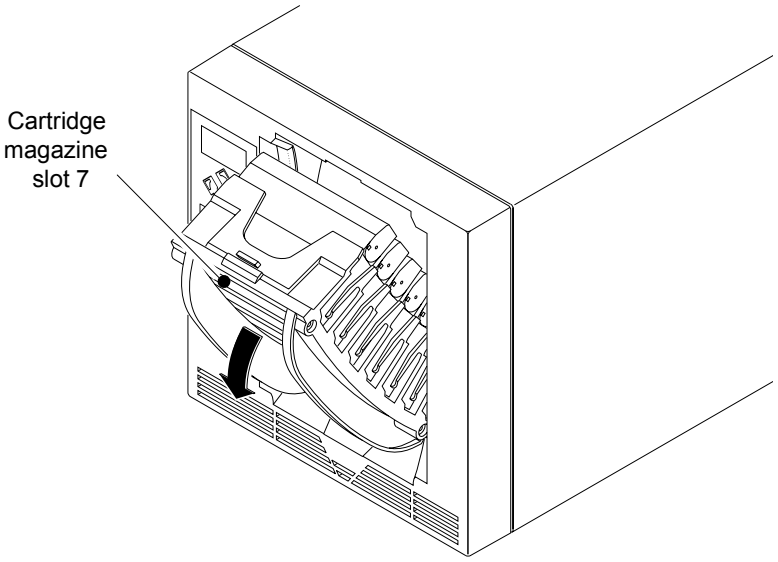


Figure 4-1 *Removing the cartridge magazine*

If you suspect the robot's gripper is holding a cartridge, power the autoloader off and back on.

INSTALLING THE MAGAZINE

! Important

Use only magazines designed for the Exabyte VXA-2 AutoPak1x7 Autoloader. Do not use Exabyte magazines designed for other Exabyte libraries.

Before installing the magazine, make sure there is not a cartridge in the drive. If you install the magazine when there is a cartridge in the drive, the autoloader cannot complete its power-on self-test, resulting in an error.

To install the magazine after accessing the cartridges or the drive:

1. Position the magazine so the bottom mounting guide on the magazine (near cartridge slot 1) aligns with the slot in the bottom of the opening in the autoloader, as shown in Figure 4-2.

Caution

Do not force the magazine into the autoloader. Forcing the magazine may break the cartridge slot fingers.

2. Push the top of the magazine until it snaps into place.

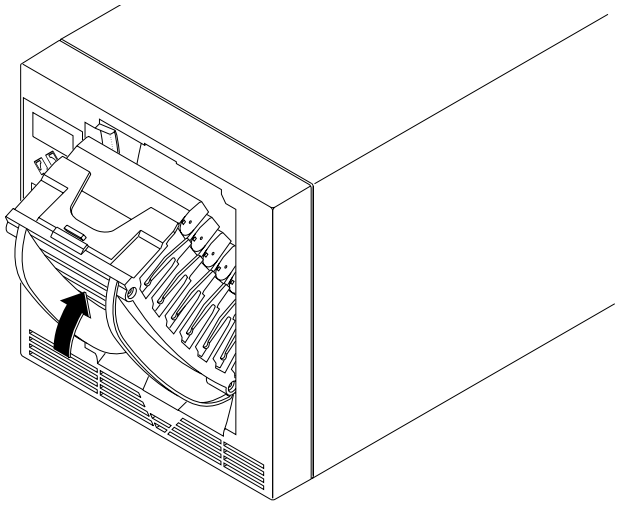


Figure 4-2 *Installing the cartridge magazine*

CLEANING THE TAPE DRIVE

Caution

Do not use any cleaning method other than the VXAtape Cleaning Cartridge (or a cleaning cartridge approved by Exabyte for use with VXA drives). Using other cleaning methods may void the tape drive's warranty.

Do not rewind and reuse the material in a cleaning cartridge. Reuse may redistribute contaminants previously removed from the tape path. If all cleaning material has been used, discard the cartridge and use a new cleaning cartridge.

Clean the tape drive whenever the autoloader displays `ClnSoon` on the Status screen or whenever your application software notifies you. (Not all software applications display cleaning requirements.) Regular cleaning helps ensure that the drive functions reliably. If `MustCln` appears on the Status screen, the drive will not perform write or read functions until it is cleaned.

Note: Some software applications automatically perform drive cleaning. If your application software supports automatic cleaning, store a cleaning cartridge in the magazine slot specified by the application. Refer to the documentation for your software.

Follow these steps to clean the tape drive:

1. Park the robot and remove the magazine, as follows:

   a. From the Main Menu, press ↑ or ↓ until the following screen appears:

   ```
   ▸ Park &
     Unlock
   ```

   b. Press ENTER. The following message flashes on the screen:

   ```
   Unlock Magazine Yes:ENTER No:ESCAPE
   ```

   c. Press ENTER to unlock the magazine. The robot parks at the top of the autoloader and the magazine's solenoid releases.

   d. Grasp the magazine at the top (near cartridge slot 7) and pull out.

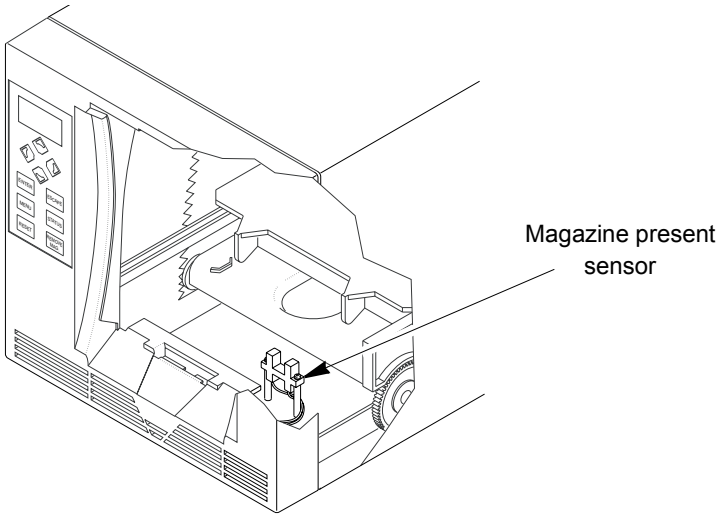
Caution

Do not force the magazine out of the autoloader. Doing so may damage the magazine or the robot.

2. Insert the cleaning cartridge into the tape drive. The drive automatically performs the cleaning process in less than one minute and ejects the cartridge when the process is complete.

Caution

Do not touch the Magazine Present sensor when inserting or removing the cleaning cartridge.



Important

If the drive ejects the cleaning cartridge immediately after loading it, you need to replace the cleaning cartridge.

3. Remove the cleaning cartridge from the drive.

4. Confirm that the cleaning was completed by looking at the autoloader's LCD. The `ClnSoon` or `MustCln` message should be gone.

   If the LCD still displays `ClnSoon` or `MustCln`, replace the cleaning cartridge and clean the drive again. If the message is still on the autoloader LCD, there may be a problem with the drive.

5. Replace the cartridge magazine.

EJECTING A CARTRIDGE MANUALLY

If a problem occurs that requires intervention, you may need to manually eject the cartridge from the tape drive.

To manually eject the cartridge:

1. Park the robot and remove the magazine, as follows:

   a. From the Main Menu, press ↑ or ↓ until the following screen appears:

   ```
   ▸ Park &
     Unlock
   ```

   b. Press ENTER. The following message flashes on the screen:

   ```
   Unlock Magazine Yes:ENTER No:ESCAPE
   ```

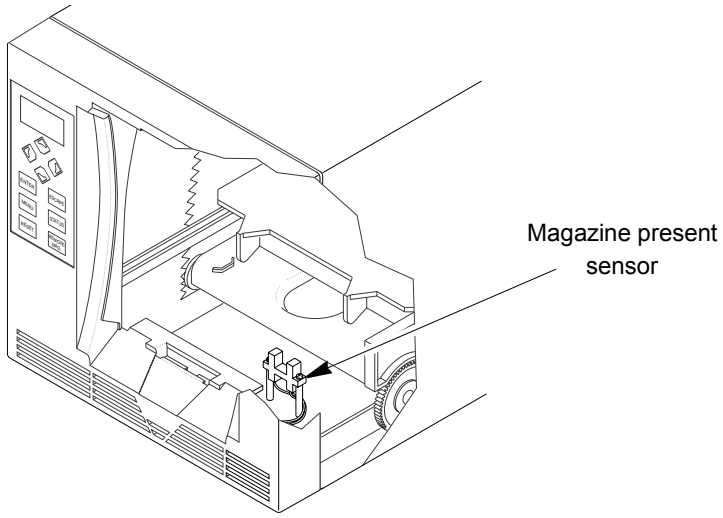
   c. Press ENTER to unlock the magazine. The robot parks at the top of the autoloader and the magazine's solenoid releases.

   d. Grasp the magazine at the top (near cartridge slot 7) and pull out.

Caution Do not force the magazine out of the autoloader. Doing so may damage the magazine or the robot.

2. Press the eject button on the drive's faceplate (see Figure 4-3).

Caution Do not touch the Magazine Present sensor when pressing the eject button.



3. Remove the cartridge from the drive.

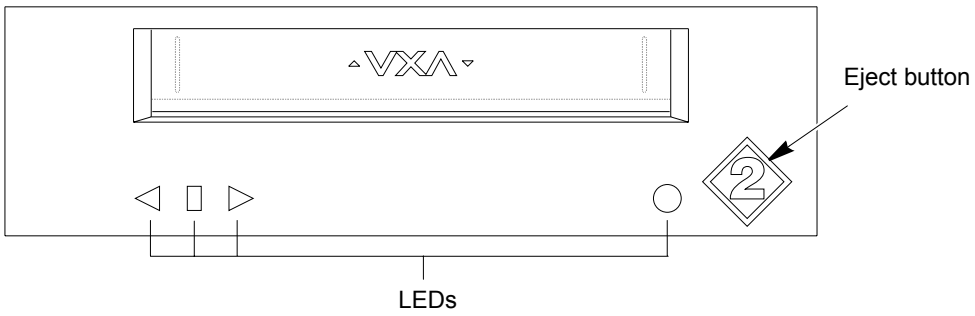


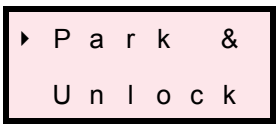
Figure 4-3 *Location of tape drive's eject button and LEDs*

MONITORING THE TAPE DRIVE'S LEDS

The VXA-2 tape drive's faceplate has four LEDs, shown in Figure 4-3, that indicate the drive's operational status.

To view the tape drive's LEDs:

1. From the Main Menu, press ↑ or ↓ until the following screen appears:



2. Press ENTER. The following message flashes on the screen:

```
Unlock Magazine Yes:ENTER No:ESCAPE
```

3. Press ENTER to unlock the magazine. The robot parks at the top of the autoloader and the magazine's solenoid releases.

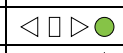
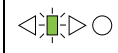
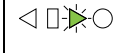
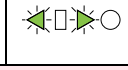
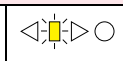
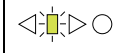
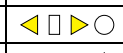
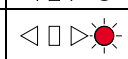
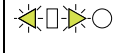
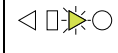
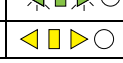
4. Grasp the magazine at the top (near cartridge slot 7) and pull out.

Caution Do not force the magazine out of the autoloader. Doing so may damage the magazine or the robot.

Table 4-1 shows the tape drive's LED combinations and the conditions they indicate.

KEY: Flashing LEDs = On = Off =

Table 4-1 *Tape drive LED states*

Operation	LED Pattern	LED #1 ◁	LED #2 ▯	LED #3 ▷	LED #4 ○
Operational Conditions					
Power-on self-test	(LEDs illuminate sequentially)[a]				
No tape loaded		Off	Off	Off	Green
SCSI activity; (LED 4 may flash with other LED operations)		Off	Off	Off	Flashing Green
Tape loading or unloading		Off	Flashing Green	Off	Off
Tape ready; idle		Off	Green	Off	Off
Reading		Off	Off	Green	Flashing Green
Writing		Off	Off	Yellow	Flashing Green
Space forward		Off	Off	Flashing Green	Off
Space reverse or rewinding		Flashing Green	Off	Off	Off
Cleaning in process		Flashing Green	Off	Flashing Green	Off
Service Notification					
Cleaning required		Off	Flashing Yellow	Off	Off
Cleaning tape used up		Off	Flashing Green/ Yellow	Off	Off
Recoverable error[b]		Yellow	Green	Yellow	Off
Unrecoverable error[b]		Yellow	Off	Yellow	Off
Factory service may be required[c]		(May be illuminated green, yellow, or off.)			Flashing Red
Broken tape		Flashing Green/ Yellow	Off	Flashing Green/ Yellow	Off
Format recovery[d]		Off	Off	Flashing Green/ Yellow	Off
Tape path over temperature[e]		Off	Off	Off	Orange
Self Tests					
Self-test passed		Green	Green	Green	Off
Self-test running		(Fast scrolling green)			Off
Self-test failed[f]		Yellow	Yellow	Yellow	Off

[a] For the power-on self-test, the LEDs scroll sequentially right to left then left to right in yellow and green. LED 4 illuminates in red and green. When POST is completed, LED 4 is illuminated in green.

[b] Retry the operation. If the problem persists, try power cycling the drive to clear the error. If you cannot resolve the problem yourself, contact Exabyte Technical Support.

[c] You may need to return the drive for service; contact Exabyte Technical Support.

[d] The tape was written without a valid end-of-data mark, which often occurs if you power-down the drive while the drive was writing. The tape drive will perform a format recovery, which involves reading the data to determine where the end of data is located. This may take as long as 2 to 3 hours.

[e] Contact Exabyte Technical Support.

[f] If a self-test fails, clean the drive with a VXAtape cleaning cartridge. If the failure still occurs, try a new tape.

RESETTING THE AUTOLOADER AND TAPE DRIVE

If the autoloader or tape drive has encountered an error and is still not operating after you have tried the recommended corrective action, you may need to perform a reset.

Caution Before resetting the autoloader and tape drive, make sure they are not communicating across the SCSI bus. A reset may disrupt communications on the SCSI bus.

To perform a reset, use one of the following methods:

- Press RESET on the operator panel, then press ENTER at the confirmation screen (or press ESCAPE to cancel). This method resets the autoloader only, not the tape drive.
- Perform a power-on reset by powering the autoloader off and back on. This method resets the autoloader and the tape drive.

When the power-on self-test is complete, the Status screen appears on the LCD.

Note: If the autoloader is performing a cartridge move operation when it is reset, it attempts to complete the move operation after it performs the power-on self-test.

VIEWING AUTOLOADER AND TAPE DRIVE INFORMATION

The functions in the Autoloader Info Menu and Drive Info Menu are mainly for use by Technical Support and application developers. Technical Support personnel may ask you to display one of these screens and locate information to help troubleshoot a problem.

This section describes the following autoloader and tape drive information:

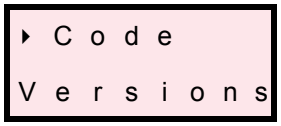
- **Autoloader code versions.** Contains information about the autoloader's flash code level and boot code level.
- **Autoloader system statistics.** Contains information about robot operations.
- **Autoloader system sensors.** Contains information about the autoloader's mechanical sensors.
- **Autoloader inventory.** Contains information about the elements.
- **Tape drive status and display information.** Contains information about the tape drive.

VIEWING AUTOLOADER CODE VERSIONS

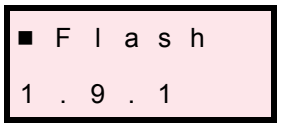
The Autoldr Info Menu contains information about the flash code level and the boot code level.

To view code levels:

1. Select Autoldr Info Menu from the Main Menu, then scroll until you see the following screen:

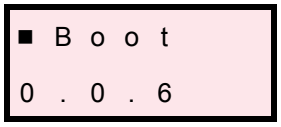


2. Press ENTER. The following screen appears:



Note: Your code levels may be different.

3. To view the level of the boot code, press ↑ or ↓ until you see the following screen:

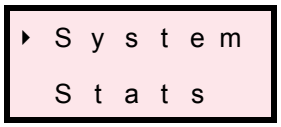


VIEWING AUTOLOADER STATISTICS

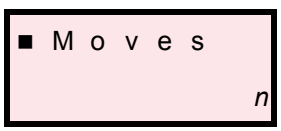
The Autoldr Info Menu contains a System Stats submenu.

To view statistics:

1. Select Autoldr Info Menu from the Main Menu, then scroll until you see the following screen:



2. Press ENTER to view the system statistics. The following screen appears:



In this example, *n* is the total number of times the robot has picked a cartridge and placed it in the drive or a cartridge slot.

3. To view the other system statistics, press ↑ or ↓ until you see the statistic you want. Table 4-2 describes the system statistics you can view.

Note: The System Statistics are cumulative across resets.

Table 4-2 *Autoloader system statistics*

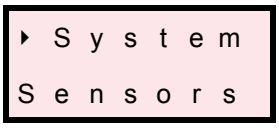
System Statistics	Description
PickRet (Pick Retry)	The number of times the robot retried picking a cartridge.
PutRet (Put Retry)	The number of times the robot retried placing a cartridge.
ThetRe (Theta Retry)	The number of times the robot retried to position itself on the theta axis.
PwrCnt (Power Cycle Count)	The number of times the autoloader has been power cycled or reset from the operator panel.
Loads	The number of times the robot loaded (pushed) a cartridge into the drive.
Reloads	The number of times the robot reloaded the cartridge in the drive because the drive ejected the cartridge too soon.
ShrtLds (Short Loads)	The number of times the robot reloaded a cartridge into the drive, either because the drive ejected the cartridge too soon and the cartridge was not ejected far enough, or the cartridge did not load completely into the drive on the first attempt.
DPckRet (Drive Pick Retry)	The number of times the robot retried picking from the drive because the drive did not eject the cartridge far enough.

VIEWING AUTOLOADER SYSTEM SENSORS

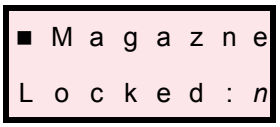
The System Sensors screens enable you to troubleshoot hardware problems by checking the current status of the autoloader's internal mechanical sensors.

To view system sensors:

1. Select Autoldr Info Menu from the Main Menu, then scroll until you see the following screen:



2. Press ENTER to view the system sensor information. The following screen appears:



In the preceding example, *n* indicates whether the magazine is locked (1) or unlocked (0).

3. To view the other system sensors, press ↑ or ↓ until you see the sensor you want. Table 4-3 describes the remaining system sensors.

Table 4-3 *Autoloader system sensors*

System sensors	Description
Magazne Presnt (Magazine Present)	Indicates whether the magazine is inserted in the autoloader (1) or not (0).
Cart Ejectd (Cartridge Ejected)	Indicates whether a cartridge is protruding from the drive (1) or not (0).
Cart Seated (Cartridge Seated)	Indicates whether a cartridge is seated in the robot (1) or not (0).
Slot Snsr	Provides feedback that helps the firmware track where the robot is on its theta axis.
Theta Home	Indicates whether the robot is in its home position (1) or not (0).
Picker St (Picker State)	Indicates the status of the robot's picker mechanism, as follows: 07 –The picker is at home position (fully extended). 1f –The picker is in the tray position. 0a –The picker is extended (waiting for the cartridge to eject from the drive). 0c –The picker is retracted. 0f –The picker is between the home position and the tray position. 1e –The picker is between the tray position and the extended position. 0e –The picker is between the extended position and the retracted position.

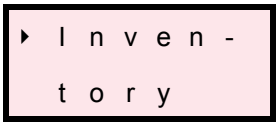
VIEWING AUTOLOADER INVENTORY INFORMATION

The autoloader stores inventory information in nonvolatile RAM and uses the information to process SCSI commands from the application software. The inventory contains information about the following element locations:

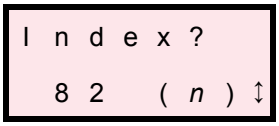
- Cartridge slots
- Tape drive
- Robot

To view the Inventory Menu:

1. Select Autoldr Info Menu from the Main Menu, then scroll until you see the following screen:



2. Press ENTER to view the inventory information. The following screen appears:



   In the example above, *n* can be D, R, or S, as follows:
   D – the drive
   R – the robot
   S – a cartridge slot

3. Press ↑ or ↓ to select the element index you want to view. Then press ENTER. Table 4-4 describes the inventory information you can view about each element.

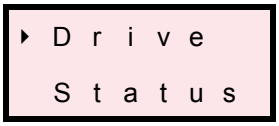
Table 4-4 Autoloader inventory information

Element info	Description
Occup (Occupied)	Indicates whether the autoloader considers the specified element location to contain a cartridge (1) or not (0).
Valid (Occupied Valid)	Indicates whether the Occupied flag is accurate (1) or questionable (0).
Access (Tape Drive Accessible)	Indicates whether a cartridge is loaded in the drive (0) or the drive is empty or the cartridge is ready to be picked (1).
Present (Cartridge Magazine, Tape Drive Present)	Indicates whether the magazine or drive is installed (1) or not (0). If the element index references a storage element, this flag indicates whether the magazine is installed. If the element index references the drive, this flag indicates the drive is installed. **Note:** The Present flag is always 1 for the robot.
Warning	Shows if there are any errors for the specified element index. (See page 67 for a list of error codes and corrective actions.)
Source (Source Element Index)	Shows the index of the last storage element from which a cartridge was moved.
Theta	Shows the theta axis position in steps from the home position.
Address	Shows the SCSI element address of the specified element.
Rsrv (Reserved)	The element is reserved by a host (1) or not (0).
Host	The SCSI ID of the host that is reserving the element.
Reserve ID	The ID that the element is reserved under. This is a number assigned to the element by a host when the reservation was made.
TotPuts Total Puts)	Shows the total times the robot tried to put to that element since the last reset.
PckRety (Pick Retry)	Shows the total times the robot retried to pick from that element since the last reset.
PutRety (Put Retry)	Shows the total times the robot retried to put to the element since the last reset.

VIEWING TAPE DRIVE STATUS INFORMATION

To view tape drive status information:

1. Select Drive Info Menu from the Main Menu.
2. Press ENTER to display the Drive Info Menu. The following screen appears:



3. If you want to view drive status information, press ENTER to display the Drive Status screen. Table 4-5 lists the information displayed on the Drive Status screen.

Table 4-5 *Tape drive status information*

Status	Description
Type	Displays the type of drive installed.
Serial#	Displays the serial number of the drive.
BootVer (Boot Version)	Displays the code level of the drive's boot ROM.
FlshVer (Flash Version)	Displays the code level of the drive's flash EPROM.
Needs Clean	Indicates whether the drive is clean (0) or needs to be cleaned (1).
Cart St (Cartridge Status)	Displays the status of the cartridge, if any, in the drive: **Loaded** – A cartridge is in the drive and the tape is loaded into the tape path. **Loading** – A cartridge is being loaded into the drive. **Unloading** – A cartridge is being unloaded from the drive. **Present** – A cartridge is in the drive, but the tape is not loaded in the tape path. **Empty** – The drive does not contain a cartridge.
Format	Displays the data format of the cartridge currently in the drive.
Present	Indicates whether a drive is installed (1) or not (0).
Occupid (Occupied)	Indicates if a cartridge is loaded in the drive (1) or not (0).
OccVald (Occupied Valid)	Indicates if the occupied information is reliable (1) or not (0).
Access	Indicates if the drive is accessible to the robot (1) or not (0).

4. To view additional drive information, press ↓ from the Drive Info Menu and then press ENTER to display the Drive Display screen. The following screen appears:

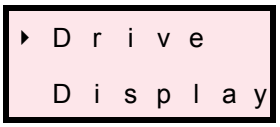


Table 4-6 lists the messages that can appear on the Drive Display screen.

Table 4-6 *Tape drive display information*

Tape drive status messages	
RdyNoTp	The tape drive is ready to accept a cartridge.
Rdy-Out	The tape drive has ejected a cartridge. The cartridge is positioned in the drive opening.
RdyTape	The tape drive has a tape loaded.
Unloadg	The tape drive is in the process of unloading a tape.
Loading	The tape drive is in the process of loading a tape.
MustCln	The tape drive needs to be cleaned with a cleaning tape.

PERFORMING HARDWARE EXERCISES

This section describes hardware exercises you can perform from the operator panel to test autoloader functions. Hardware exercises are available from the Demo Menu and the Command Menu. The Demo Menu causes the robot to randomly move cartridges between slots. The Command Menu provides options for specific robot movements.

USING ELEMENT INDEXES

Elements are the physical locations in the autoloader that can accept a cartridge (the robot, the magazine slots, and the drive).

Each element has an *element index* that enables the autoloader to identify it. Many operator panel functions require you to specify element indexes. For example, to move a cartridge using the Command Menu, you must specify the source and destination element indexes. The source is either the drive or a cartridge slot where the robot will pick a cartridge. The destination is either the drive or a cartridge slot where the robot will place the cartridge.

Note: Your application software may use *element addresses* to identify elements in the autoloader. The difference between an element index and an element address is that an index is a fixed number set in the autoloader's firmware, whereas an address can be changed by your application software. The autoloader's default element addresses correspond to the element indexes.

Figure 4-4 shows the element indexes assigned for the autoloader.

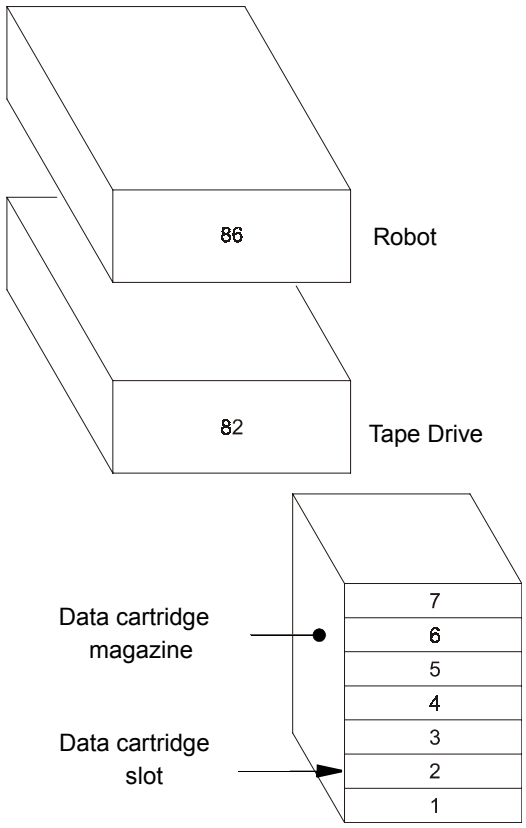
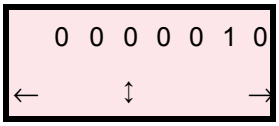


Figure 4-4 *Element index assignments*

USING THE DEMO MENU

Before running the demo:

1. Disable security if it is enabled (see page 31).
2. Change the control mode to LCD (see page 28).
3. Verify that there is at least one cartridge present and one empty slot before you begin the test.
4. From the Main Menu, select Demo Menu. The message `Set total demo moves` flashes on the screen, then the following screen appears:



In the example above, the number of demo moves is set to 10.

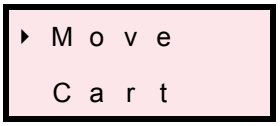
5. Press ← or → to move the screen arrow to the digit you want to change, then press ↑ or ↓ to select the number you want.

6. Press ENTER to start the demo.

USING THE COMMAND MENU

To perform hardware exercises and inventory checks:

1. From the Main Menu, select Command Menu. The following screen appears:



2. If you want to move a cartridge, press ENTER. If you want to perform other exercises, press ↑ or ↓ until you see the exercise you want to perform and then press ENTER.

Table 4-7 describes each exercise and provides additional instructions for performing the tests (if applicable).

Table 4-7 *Hardware exercises available through the Command Menu*

Test	Description	Additional instructions
Move Cart (Move Cartridge)	Moves a cartridge from one location to another. **Important:** Do not load a cartridge in the drive. The drive will not automatically eject the cartridge.	When you select Move Cart, the Move Src? screen appears. Press ↑ or ↓ to select the source index (the slot you want the robot to pick from), then press ENTER. The Move Dest? screen appears. Press ← or → to select the destination index (the slot where you want the robot to place the cartridge), then press ENTER.
Init Element (Initialize Element Status)	Performs an inventory of the cartridges.	
Pos to Element (Position to Element)	Positions the robot in front of the drive or a magazine slot.	When you select Pos to Element, the Pos Elem Dest? screen appears. Press ← or → to select the element index where you want to position the robot, then press ENTER.
Self Test	Cycles the robot and picker through their entire ranges of motion once.	
Park	Moves the robot to the top of the autoloader.	

Table 4-7 *Hardware exercises available through the Command Menu (continued)*

Test	Description	Additional instructions
Home Robot	Moves the robot to its home position in front of the drive.	
Cycle Pick/Put	Causes the robot to take a cartridge from a specified element and replace it in the same location the number of times you requested.	When you select Cycle Pick/Put, the Cycle PP Src? screen appears. Press ← or → to select the source index (where you want the robot to pick and put the cartridge) and press ENTER. The message `Select number of test cycles` flashes on the screen. Press ← or → to move the screen arrow to the digit you want to change. Then, press ↑ or ↓ to select the number of cycles you want this test to run and press ENTER.
Cycle Theta	Moves the robot up and down the number times you requested.	When you select Cycle Theta, the message `Select number of test cycles` flashes on the screen. Press ← or → to move the screen arrow to the digit you want to change. Then, press ↑ or ↓ to select the number of cycles you want this test to run and press ENTER.
Cycle Reach	Causes the following: ▪ The robot to move to its home position on the theta axis ▪ The picker to move to the extended position, to the retracted position, and back to the extended position	When you select Cycle Reach, the message `Select number of test cycles` flashes on the screen. Press ← or → to move the screen arrow to the digit you want to change. Then, press ↑ or ↓ to select the number of cycles you want this test to run and press ENTER.
Cycle Solenoid	Exercises the solenoid that controls the locking mechanism on the magazine the number of times you requested.	When you select Cycle Solenoid, the message `Select number of test cycles` flashes on the screen. Press ← or → to move the screen arrow to the digit you want to change. Then, press ↑ or ↓ to select the number of cycles you want this test to run and press ENTER. You will hear a click each time the solenoid extends and retracts.

STORING CARTRIDGES

After you have filled cartridges with data, you may want to store them outside of the autoloader to make room for additional cartridges. To maximize the shelf life of your cartridges and ensure data integrity, follow these storage guidelines:

- **Store cartridges in a suitable environment.** Follow the specifications for storage temperature and other environmental requirements, as described on the cartridge packaging. Do not allow the temperature and humidity in the storage environment to fluctuate.

- **Store cartridges with the write-protect switch in the protected position**. See page 12.

- **Keep the storage location as free of airborne particulates as possible.** To eliminate obvious sources of particulates, do not permit anyone to smoke, eat, or drink near the storage area, and do not store cartridges near a copier or printer that may emit toner and paper dust.

- **Store cartridges as soon as possible after you remove them from the autoloader.** Immediate storage helps avoid many of the conditions that can damage tapes, such as temperature and humidity fluctuation, particulate contamination, and excessive handling.

5

MAINTENANCE

This chapter describes basic autoloader maintenance tasks, including:

- Cleaning the autoloader
- Using touch-up paint on the housing
- Upgrading firmware and creating diagnostic listings

CLEANING THE AUTOLOADER

! Important The autoloader's internal components are lubricated at the factory and should not be cleaned or relubricated. To protect the internal components from dust, keep the autoloader's magazine in place.

The only autoloader components that should be cleaned are the tape drive and the operator panel. Instructions for cleaning the tape drive are provided on page 36. To clean the operator panel, use wipes or spray cleaners appropriate for LCD screens or computer monitors.

Caution To avoid scratching the operator panel, do not use abrasive cleaners, abrasive cleaning implements, harsh chemicals, or solvents.

USING TOUCH-UP PAINT ON THE HOUSING

A paint kit is available for touching up nicks and scratches on the finish. For ordering information, contact Exabyte (see page iv).

UPGRADING FIRMWARE AND CREATING DIAGNOSTIC LISTINGS

The autoloader features an internal interface that provides access to the autoloader's firmware. You can use this interface, called Console, to upgrade the autoloader's firmware, create diagnostic listings, and view the LCD password for unlocking the operator panel menus.

To upgrade firmware and create diagnostic listings for the VXA-2 tape drive, use VXA2Tool, a Windows®-based program available from the Exabyte web site at www.exabyte.com. VXA2Tool allows you to upgrade firmware and perform diagnostics over the SCSI bus attached to the autoloader.

This section describes how to do the following:

- Connect to the autoloader's Console interface
- Upgrade autoloader firmware via Console
- Create a diagnostic listing via Console
- View the LCD password via Console
- Upgrade tape drive firmware and create diagnostic listings

CONNECTING TO THE AUTOLOADER'S CONSOLE INTERFACE

To access Console, you must have the following:

- A host computer that uses an RS232 serial port
- A straight-through 9-pin serial cable (not a null modem cable)
- Terminal emulation software, such as HyperTerminal

Note: Exabyte recommends using HyperTerminal, a standard communications package included with Microsoft Windows®.

Connecting the Serial Cable

1. Power off the autoloader and disconnect the power cord.

2. Connect the 9-pin cable to the back of the autoloader and to the host computer. Figure 5-1 shows the location of the 9-pin serial port on the back of the autoloader.

3. Connect the power cord and power on the autoloader.

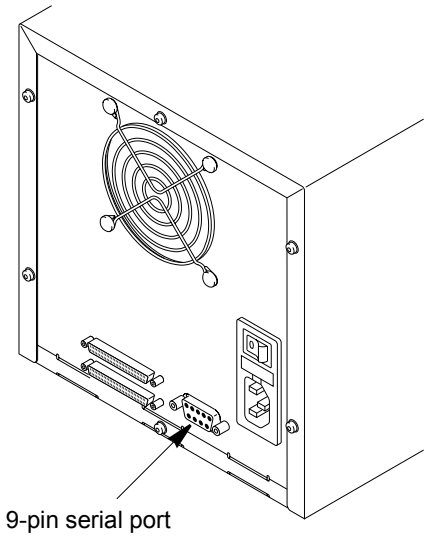


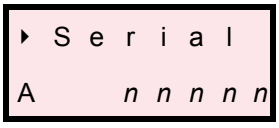
Figure 5-1 *Location of serial port for accessing the autoloader's Console interface*

Setting the Autoloader's Baud Rate

Before accessing Console, you must set the baud rate for the autoloader so that it matches the host computer's baud rate.

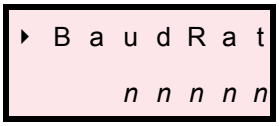
To set the autoloader's baud rate:

1. From the Main Menu, scroll until you see the following screen:



2. In the example above, *nnnnn* is the current baud rate for the autoloader.

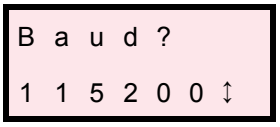
3. To change the autoloader's baud rate, press ENTER. The following screen appears:



4. Press ENTER. The following message flashes on the screen:

   `Select serial port baud rate for Auto Loader`

   Then, the following screen appears:



5. Press ↑ or ↓ until you see the baud rate that matches the baud rate set on the host, and then press ENTER.

Accessing Console using HyperTerminal

Note: These instructions assume you are using HyperTerminal. If desired, you can use a different terminal emulation software package.

To access Console using HyperTerminal:

1. From your computer, launch HyperTerminal.

2. In HyperTerminal's Connection Description screen, enter a name and choose an icon for this communications session.

3. In HyperTerminal's Connect To screen, choose the communications port you are using from the Connect Using field. Click OK.

4. In the Properties screen, make sure the fields contain the following values, then click OK.

   - *Bits per second:* (baud rate of the autoloader)
   - *Data bits:* 8
   - *Parity bits:* none
   - *Stop bits:* 1
   - *Flow control:* none

5. Check the ASCII setup from HyperTerminal:

   a. From the File menu, select Properties.

   b. In the Properties screen, select the Settings tab.

   c. In the Emulation mode field, select "ANSI."

   d. Click on the ASCII Setup button.

   e. In the ASCII Setup screen, make sure none of the boxes have check marks. Uncheck the boxes, if necessary.

   f. Click OK in the ASCII Setup screen.

   g. Click OK again in the Properties screen.

6. The Console program should now appear in HyperTerminal's main window. If necessary, type `redraw` and then press **Enter** to refresh the screen.

7. If desired, type `help` and then press **Enter** to display Console's Help screen, as shown in Figure 5-2.

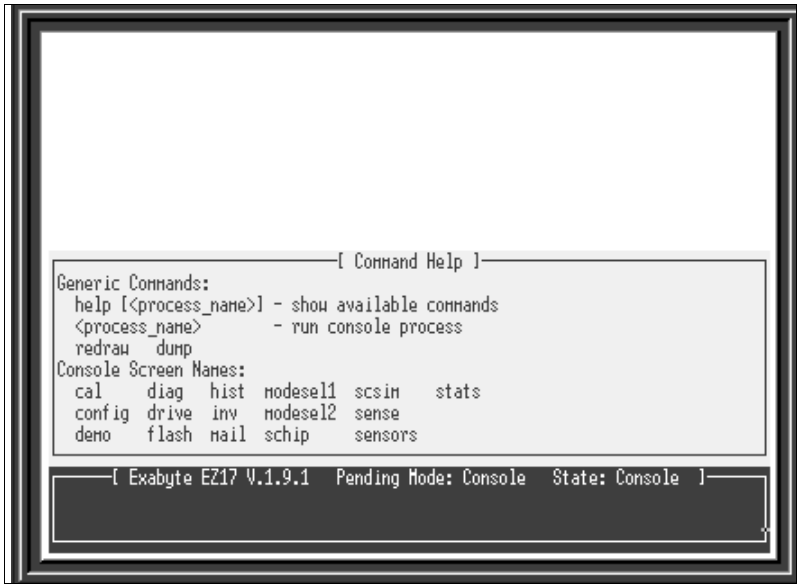


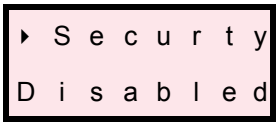
Figure 5-2 *Console Help screen*

Note: If garbled characters or no characters appear on the screen, make sure you have the same baud rate set for the host as you do for the autoloader.

Setting the Autoloader to Console Mode

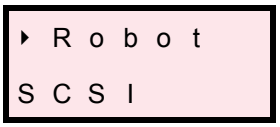
Set the autoloader to Console mode by following these steps:

1. Press MENU. The following screen appears:



2. Disable LCD security if it is enabled, as described on page 31.

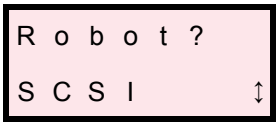
3. Press ↑ or ↓ to scroll through the Main Menu until you see the following screen:



4. Press ENTER. The following message flashes on the screen:

   `Select I/F that controls robotic motions`

   Then, the following screen appears:



5. Press ↑ or ↓ until you see Console and press ENTER to select it.

UPGRADING AUTOLOADER FIRMWARE VIA CONSOLE

Caution

Do not upgrade firmware unless Exabyte Technical Support has advised you to do so. If performed improperly, the upgrade procedure can render your autoloader inoperable. Consult with Exabyte Technical Support before performing an upgrade.

Because of memory limitations, the autoloader cannot validate the new firmware data before erasing and reprogramming the flash EEPROM. If the checksum calculated by the autoloader does not match the embedded checksum, the new firmware will be unusable. Therefore, *before* performing the write firmware operation, use the READ BUFFER SCSI command to create a copy of your current firmware.

To upgrade the autoloader's firmware using the Console interface:

1. Obtain new firmware for the autoloader. You can download new firmware from Exabyte's web site (www.exabyte.com), or you can contact Exabyte Technical Support.

2. Access Console by following the steps on page 55.

3. If desired, you can use the SCSI READ BUFFER command to copy the current firmware to disk. To do this, use a software application that can issue SCSI commands. For more information about the SCSI commands, refer to the SCSI reference for your autoloader.

4. From Console, type `flash` and press **Enter**. This displays the Flash screen, as shown in Figure 5-3.

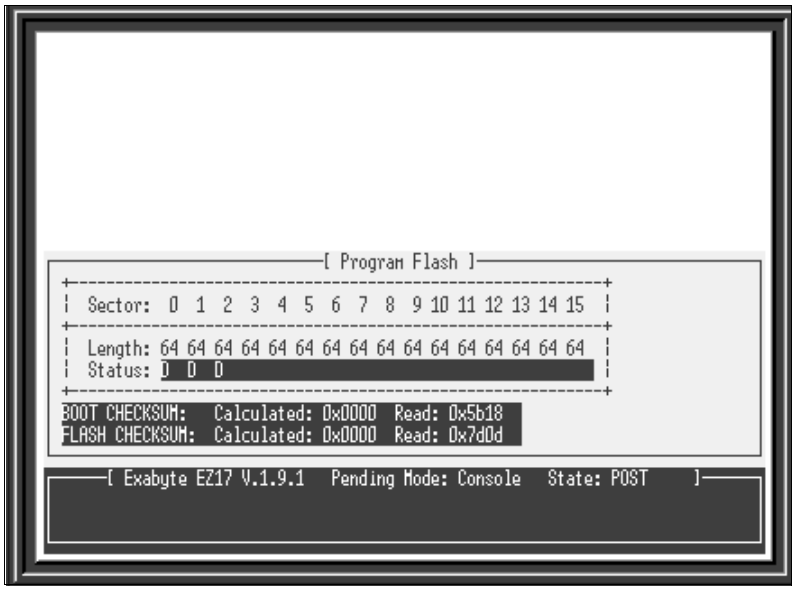


Figure 5-3 *Console Flash screen*

5. Type `pflash` and press **Enter.** The autoloader erases the flash EEPROM sectors and then displays the following prompt:

   ```
   Begin XMODEM download of flash code.
   ```

6. Use your terminal emulation software to specify the source location (path and filename) of the new firmware. For HyperTerminal, follow these steps:

   a. Select the Transfer menu.

   b. Select Send File.

   c. In the Send File screen, enter the path and file name of the firmware or click on the Browse button to locate the file. Select XModem as the protocol.

   d. Click on Send.

The system initiates the firmware upgrade and displays its progress on the screen. When the upgrade is successfully completed, the autoloader resets.

Caution Do not attempt to perform autoloader operations or power down the autoloader until after the autoloader automatically resets.

CREATING A DIAGNOSTIC LISTING VIA CONSOLE

If you report a problem to Exabyte Technical Support, you may be asked to create an autoloader diagnostic listing (also called a *dump*) via the Console interface. A diagnostic listing is created when you use a terminal emulation program (such as HyperTerminal) to send an ASCII text copy of the diagnostic buffer from the autoloader to the host computer. This buffer information can be used by support personnel to troubleshoot incidents with the autoloader.

Note: These instructions assume you are using HyperTerminal. If desired, you can use a different terminal emulation software package.

To create a diagnostic listing:

1. Access Console by following the steps on page 55.

2. Type `dump` and press **Enter**.

3. Select the Transfer menu, then select Capture Text.

4. In the Capture Text screen, enter the path and filename for the ASCII text file and press **Enter**.

5. Press **Enter** again to start transferring the ASCII text file.

6. When the transfer is complete, select the Transfer menu, then select Capture Text and Stop.

VIEWING THE LCD PASSWORD VIA CONSOLE

You can view the LCD password from the Configuration Information screen in the Console interface.

To view the LCD password:

1. Access Console by following the steps on page 55.

2. Type `config,` then press **Enter**. The Configuration Information screen appears, as shown in Figure 5-4. The password appears next to the LCD password field.

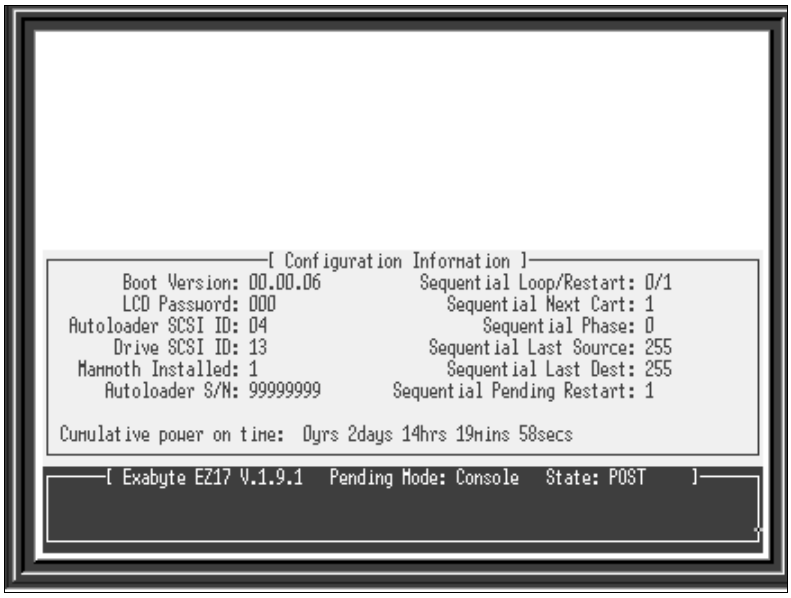


Figure 5-4 *Console Configuration Information screen*

UPGRADING THE TAPE DRIVE'S FIRMWARE AND CREATING DIAGNOSTIC LISTINGS

To upgrade firmware and create diagnostic listings for the VXA-2 tape drive, download VXA2Tool from www.exabyte.com. VXA2Tool allows you to upgrade firmware and perform diagnostics over the autoloader's SCSI bus. Refer to the readme file provided with the program for installation instructions. Refer to the program's online help for instructions on performing upgrades and diagnostics.

You can download new firmware from www.exabyte.com or you can contact Exabyte Technical Support for firmware.

Caution

Do not upgrade firmware unless Exabyte Technical Support has advised you to do so. If performed improperly, the upgrade procedure can render your tape drive inoperable. Consult with Exabyte Technical Support before performing an upgrade.

6

TROUBLESHOOTING AND ERROR CODES

This chapter provides basic troubleshooting information for the autoloader and defines error codes that may appear on the autoloader's operator panel.

TROUBLESHOOTING

This section provides suggestions for solving problems that may occur when you are installing and operating the autoloader.

Note: If an error code is displayed on the autoloader's operator panel, refer to page 67. If the LEDs on the tape drive are flashing, see page 39.

AUTOLOADER INSTALLATION PROBLEMS

If your autoloader and application software are not communicating after installation, check the following:

- ✔ **SCSI IDs.** Make sure that the SCSI IDs you selected for the drive and autoloader are not the same as an ID used by any other SCSI device on that bus, including the SCSI adapter card. Refer to page 22 for information about setting the SCSI IDs.

- ✔ **SCSI connectors.** Make sure that all SCSI cables are securely connected at both ends.

- ✔ **LVD SCSI devices.** Because the autoloader is an LVD device, all other devices on the SCSI bus should also be LVD. These devices include the controller cards, cables, terminators, and any other devices on the SCSI bus. Do not mix LVD and HVD on the same SCSI bus.

  Note: Although LVD SCSI is compatible with single-ended SCSI, Exabyte does not support single-ended devices on the autoloader's LVD SCSI bus.

- ✔ **Narrow SCSI and wide SCSI.** Because the autoloader is a wide SCSI device, all other devices on the bus must be wide.

- ✔ **SCSI cable lengths**. Make sure the SCSI cabling does not exceed maximum lengths (see page 10).

- ✔ **Termination**. Make sure your bus is properly terminated as described on page 14. Make sure that you use the correct terminator (see page 10). If another SCSI device previously terminated the SCSI bus and is no longer at the physical end of the bus, be sure to remove the terminator from that device.

- ✔ **Compatibility.** Make sure that your autoloader and tape drive are compatible with the application software you plan to use. Contact Exabyte Technical Support or your sales representative for the latest compatibility information.

- ✔ **SCSI adapter card installation.** Make sure that you installed your SCSI adapter card correctly. Refer to the documentation that came with your card for installation and troubleshooting instructions. Pay special attention to steps describing setting various jumpers and switches on the card. Make sure that the card is properly seated.

- ✔ **Software installation.** Make sure that your application software is installed and configured correctly. Refer to the documentation that came with your software. Pay special attention to steps describing configuring the software for use with the autoloader and drive.

- ✔ **Control mode.** Make sure the autoloader is operating in the correct control mode. For most applications, the control mode should be set to SCSI. See page 28 for more information.

After checking the items above, reset the autoloader as described on page 38.

AUTOLOADER OPERATION PROBLEMS

If the autoloader has been successfully operating in the past, but is now experiencing problems, check the following:

- ✔ **Control mode**. If you are using an application software package to control robot operations, the autoloader must be set to SCSI mode. See page 28 for more information. If you are operating the autoloader in Sequential mode, see page 41.

- ✔ **Security**. Make sure that security is set correctly for the operation you are trying to perform. If security is enabled, you cannot perform many operations on the LCD and you cannot remove the magazine. Security can be enabled from the LCD (see page 29) or from your application software with a SCSI command.

- ✔ **Robot operation**. You can use the selections in the Command Menu and the Demo Menu to determine if the robot is functioning properly. See page 48.

- ✔ **Firmware level.** Make sure your autoloader contains the correct versions of boot code and firmware. To check the current code levels, see page 42. To determine whether you have the latest versions, check the Exabyte web site at www.exabyte.com.

TAPE DRIVE OPERATION PROBLEMS

If you have been successfully operating the application software and autoloader in the past, but are now experiencing problems reading and writing data, check the following:

- ✔ **Write-protect switch**. If you are writing data, make sure the cartridge is write enabled (see page 12).
- ✔ **Cartridge type**. Use the appropriate cartridges for your tape drive. See page 10 for information about selecting cartridges.
- ✔ **Cartridge age**. If the cartridge has been in use for a long time or if it has been used frequently, try using a new cartridge.
- ✔ **Cleaning**. Clean the tape drive as described on page 36.

ADVANCED TROUBLESHOOTING

If you report a problem to Exabyte Technical Support, you may be asked to create a diagnostic listing. To create a diagnostic listing, you can use the autoloader's serial port and Console interface program. For more information about how to create diagnostic listings, see page 60.

To report a problem to Exabyte Technical Support, see page iv.

ERROR CODES

This section describes the error codes that appear on the autoloader's operator panel and provides corrective actions.

Caution Most autoloader components can be replaced only by Exabyte-approved service providers. If you cannot find an obstruction or other obvious cause for the problem, contact your service provider. Unless you have a self-maintenance contract, do not attempt to replace any components. If you do, you will void your warranty.

! Important Some corrective actions advise you to reset the autoloader. Before resetting, make sure there is no SCSI activity on the SCSI bus, so you do not disrupt communications.

Table 6-1 lists the autoloader error codes in numerical order.

Table 6-1 *Autoloader error codes*

Code	Description	Corrective action
10	**Dropped a tape**. The robot dropped a cartridge.	**CAUTION:** Do not try to put the cartridge back in the robot picker. ▪ Put the cartridge back in the magazine if you know where it belongs. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
11	**Source empty**. There is no cartridge in the source location.	Install a cartridge in the source location or redirect the robot to another location.
12	**Dest full**. A cartridge already exists in the destination location.	Remove the cartridge from the destination or redirect the robot to another location.
13	**Put failure**. The robot could not place a cartridge because of mechanical problems.	▪ Make sure there is nothing blocking the robot or the tape drive. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
14	**Pick failure**. The robot could not pick a cartridge because of mechanical problems.	

Table 6-1 *Autoloader error codes (continued)*

Code	Description	Corrective action
17	**CHM full wrong time**. There was a cartridge in the robot at the wrong time.	▪ Make sure there is nothing blocking the robot or the tape drive. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
18	**Source inside drive**. The robot could not successfully pick a cartridge because it was still loaded in the tape drive.	
19	**Pick error**. The robot could not pick from a full cartridge slot.	▪ Remove the cartridge magazine and look for anything that might be obstructing the robot. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
24	**Cart present bad**. Cartridge present sensor error.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
27	**Failed theta init**. Theta axis could not be initialized.	▪ Remove the magazine and look for anything that might be obstructing the robot or picker. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
28	**Failed picker init**. Could not initialize the reach axis.	
29	**Steppers failed init**. Could not initialize the theta axis or the reach axis.	
30	**Picker does not move**. The picker could not move along the reach axis.	▪ Remove the magazine and look for anything that might be obstructing the picker. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
31	**Picker failed home**. The picker could not return to the home position along the reach axis.	
33	**Picker snsr state bad**. The picker's sensor state is invalid.	
34	**Picker sensor failure**. The picker sensor(s) are defective.	
38	**Can't load drive**. The robot could not load the cartridge into the tape drive because of mechanical problems.	

Table 6-1 *Autoloader error codes (continued)*

Code	Description	Corrective action
41	**Theta home sensor**. Robot home sensor failure.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
42	**Slot detect failure**. The robot could not find the specified slot position.	
43	**Tray home sensr fail**. Tray home sensor failure.	
44	**Grip motion timeout**. Internal software error.	
45	**Theta motor slippage**. The robot had excessive slippage on its theta axis.	
48	**Theta move failure**. The robot had a positioning error while moving to pick a cartridge.	
69	**One or more tapes are inserted incorrectly.** A cartridge is upside down.	Remove the magazine and insert the data cartridge correctly. If the tapes are inserted correctly, but the autoloader continues to report this error message, press ENTER to override the error. Only use this override if you are positive that the cartridges are inserted correctly (see page 12). If you override the error and a cartridge is inserted incorrectly, you will receive a fatal error during operation.
71	**Parameter > limit**. Firmware error.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.
72	**Magazine sensor fail**. Magazine present sensor failure.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
75	**Internal S/W error**. Firmware error.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.

Table 6-1 *Autoloader error codes (continued)*

Code	Description	Corrective action
77	**Interface disabled**. The autoloader was not in the correct control mode when the operator sent a command.	Make certain you have set the correct control mode. If it is, contact your service provider.
91	**Command aborted**. An operation was aborted from the LCD, through SCSI, or through the serial port while it was in progress.	No corrective action required.
97	**Drive not installed**. There is not a tape drive installed.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider. The cable connection between the tape drive and the autoloader may be loose.
130 **131** **132** **133** **134** **135** **136** **137**	**SCSI chip error; SCSI unexpected int; SCSI int stuck error**. There is a SCSI chip failure.	▪ Make sure the autoloader is not being used by any host, then press RESET on the operator panel. ▪ If the error persists, contact your service provider or Exabyte Technical Support. You may be asked to supply a diagnostic listing; you may need new firmware or a new controller card.
194	**All slots are full**. All cartridge magazine slots contain a cartridge.	This error only appears when you are performing a demo. Remove at least one cartridge from the magazine.
195	**All slots are empty**. All cartridge magazine slots are empty.	This error only appears when you are performing a demo. Insert at least one data cartridge into the magazine.
197	**Tape in drive can't move**. Command cannot be executed because there is a cartridge in the tape drive.	Remove the cartridge from the tape drive and reissue the command.

Table 6-1 *Autoloader error codes (continued)*

Code	Description	Corrective action
198	**CHM full before move**. There was a cartridge in the robot before a move operation, initialize element status, or diagnostic test.	▪ Remove the magazine and look for anything that might be obstructing the robot. ▪ Make sure the autoloader is not being used by any host, then reset the autoloader from the operator panel. If necessary, power the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider. You may be asked to supply a diagnostic listing, and you may need new firmware.
199	**Remove tape in drive**. The cartridge must be removed before the autoloader can begin its POST.	Remove the cartridge from the tape drive.
210	**Remove all tapes for calib**. All cartridges must be removed so the autoloader can begin calibration.	▪ Remove the magazine (it is unlocked). ▪ Remove cartridges from all the magazine slots, the tape drive, and the picker. ▪ Replace the magazine. The autoloader will automatically calibrate.
211	**Eject sensor error.** There is a bad sensor or the autoloader cannot communicate with the tape drive over the serial interface and there is a cartridge protruding from the tape drive.	▪ Make sure the autoloader is not being used by any host, then reset the autoloader and the tape drive by powering the autoloader off and back on to reset the tape drive. ▪ If the error persists, contact your service provider.
212	**Remove tape in robot.** A cartridge was in the robot during POST.	▪ Remove the magazine (it is unlocked). ▪ Remove the cartridge from the robot and place it in the magazine (if you know where it goes). ▪ Replace the magazine. The autoloader automatically resumes post.

Notes

7

SHIPPING THE AUTOLOADER

This chapter describes the process of returning the autoloader for service.

If you need to return the autoloader for service, first contact your service provider. If your service provider instructs you to return the autoloader directly to Exabyte, contact Exabyte Technical Support to obtain a Return Materials Authorization (RMA) number and the shipping address (see "Contacting Exabyte" on page iv). When you have the RMA number, follow the instructions on the following pages.

PREPARING THE AUTOLOADER FOR SHIPPING

To prepare the autoloader for shipping:

1. Remove the magazine as described on page 34.
2. Remove all cartridges from the magazine. Make sure the robot and the tape drive do not contain cartridges.
3. Power off the autoloader.
4. Disconnect the power cord and any SCSI cables or terminator. Do not ship these items if you are returning the autoloader to the factory.
5. If necessary, manually push the robot down to the bottom of the autoloader (see Figure 7-1).

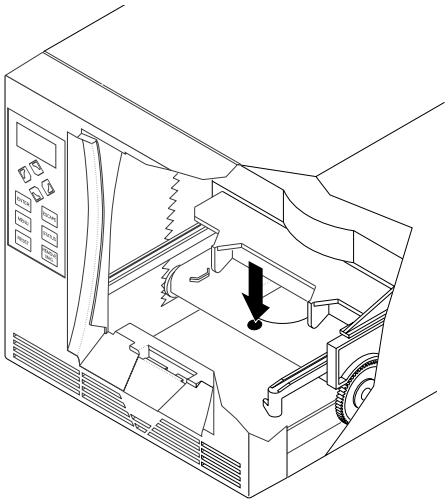


Figure 7-1 *Positioning the robot for shipping*

6. Push the picker all the way into the robot as follows:

   a. Push the picker toward the back of the autoloader until it stops (see Figure 7-2).

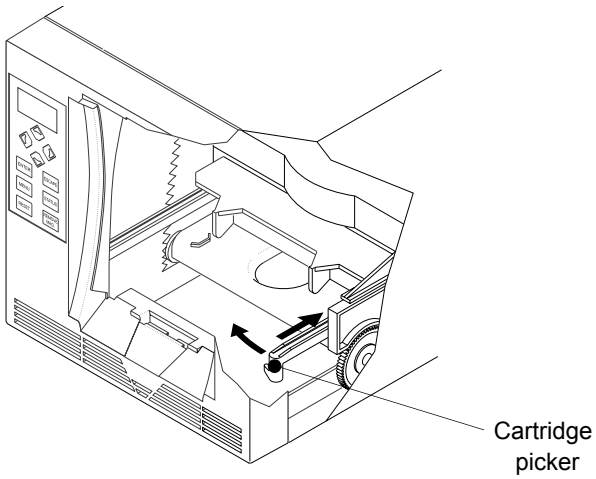


Figure 7-2 *Positioning the picker for shipping*

   b. Make sure the picker cannot be pushed any further and that it is under the robot's ESD shield (see Figure 7-3).

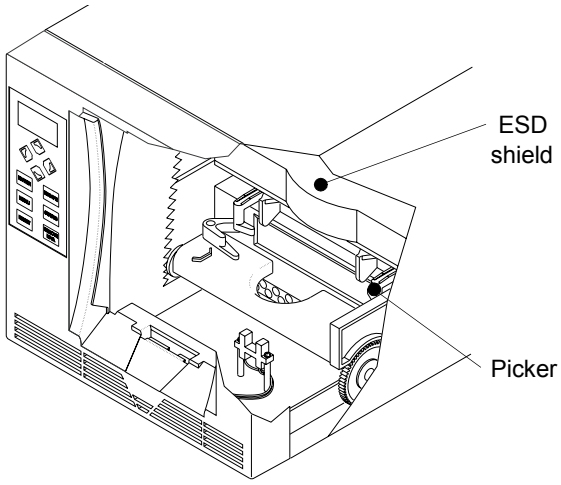


Figure 7-3 *Proper position of picker for shipping*

7. Angle one side support in through the front of the autoloader and place it between the side of the autoloader and the flipper. Be sure to push the side supports all the way in so they rest on the ESD shield (see Figure 7-4).

8. Insert the other side support into the autoloader.

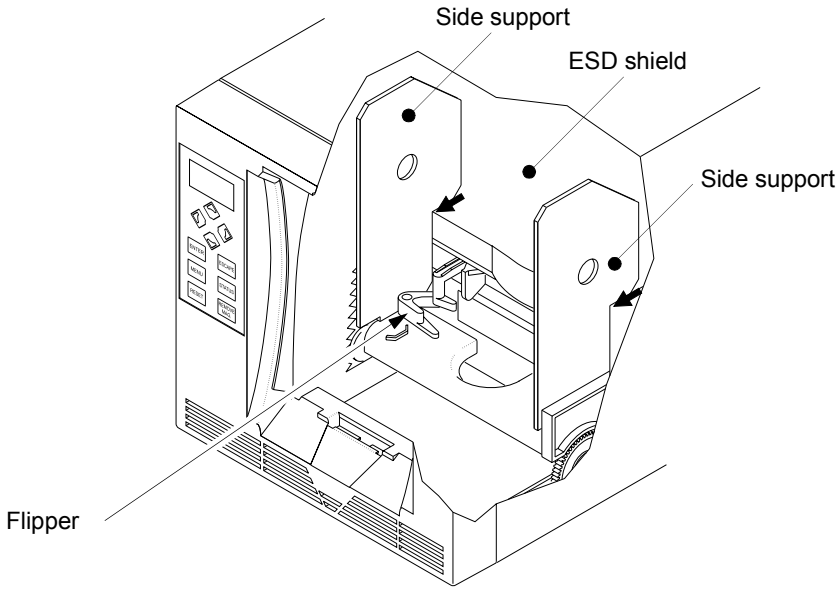


Figure 7-4 *Inserting the side supports*

9. Insert one end of the cross-brace into the hole on one of the side supports (see Figure 7-5).

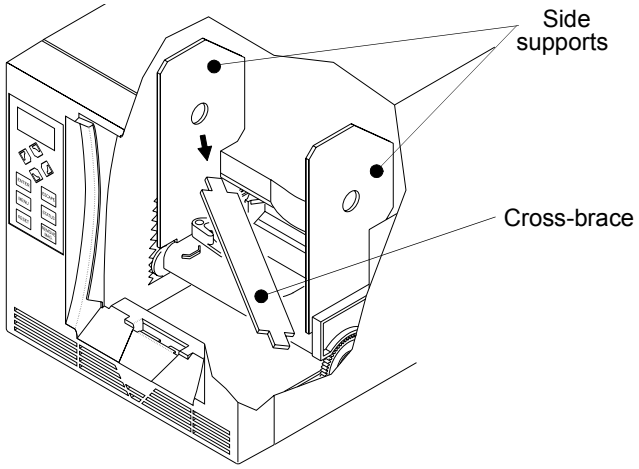


Figure 7-5 *Inserting the cross-brace*

10. Insert the free end of the cross-brace into the remaining side support. The shipping braces should be positioned as shown in Figure 7-6.

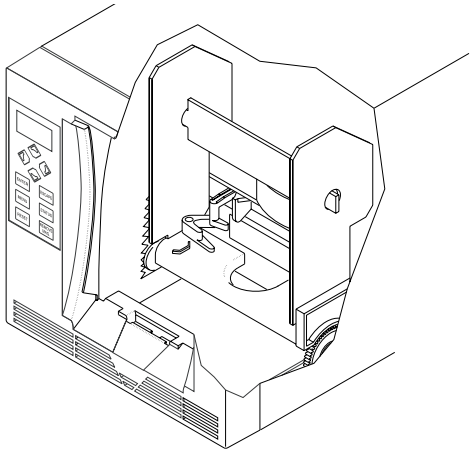


Figure 7-6 *Proper position of shipping braces*

11. Reinstall the magazine as described on page 13.

REMOVING THE AUTOLOADER FROM A RACK

If the autoloader is installed in a rack, remove it as follows:

1. Remove the screw securing the front of the autoloader to the rack (see Figure 7-7).

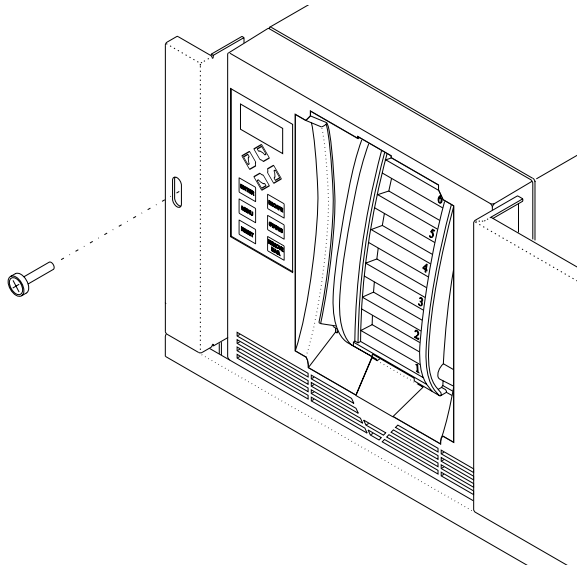


Figure 7-7 *Removing the screw securing the autoloader to the rack*

2. Slide the autoloader tray outward from the rack so that you can access the underneath side of the tray.

3. Remove the four screws that secure the bottom of the autoloader to the tray, and lift the autoloader off the tray (see Figure 7-8).

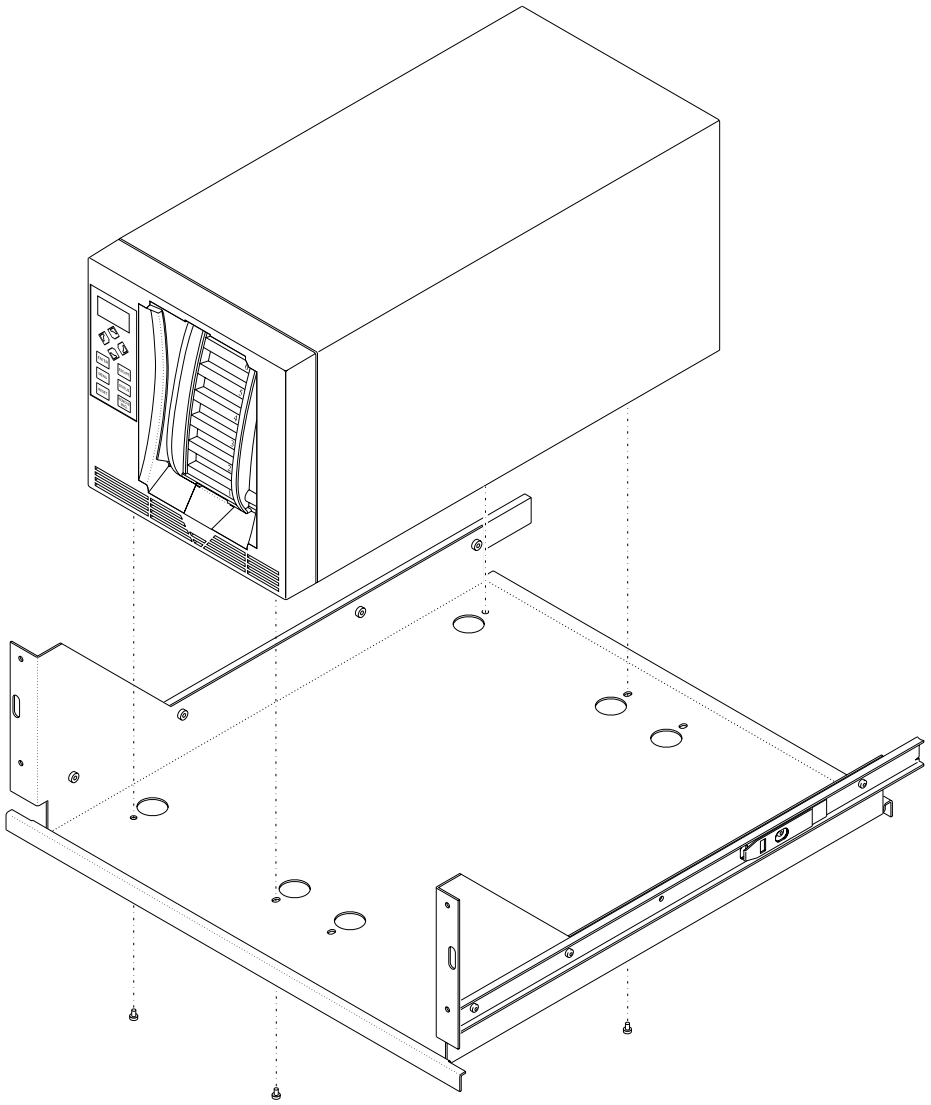


Figure 7-8 *Removing the autoloader from the tray*

PACKING THE AUTOLOADER

Use the original packing materials to pack the autoloader. You will also need banding material.

Caution To avoid damaging the autoloader and voiding your warranty, be sure to use the original shipping materials (or replacement materials obtained from your vendor) when repacking and shipping the autoloader. Do not use the shipping carton and packing materials to ship items other than an autoloader.

To pack the autoloader, follow these steps and refer to Figure 7-9:

1. Place the autoloader on the cushion in the bottom of the box.
2. Insert the empty accessory box into the autoloader box.

Important If you are shipping the autoloader for repairs, do not include the accessories.

3. Place the antistatic bag over the autoloader, then place the autoloader into the box.

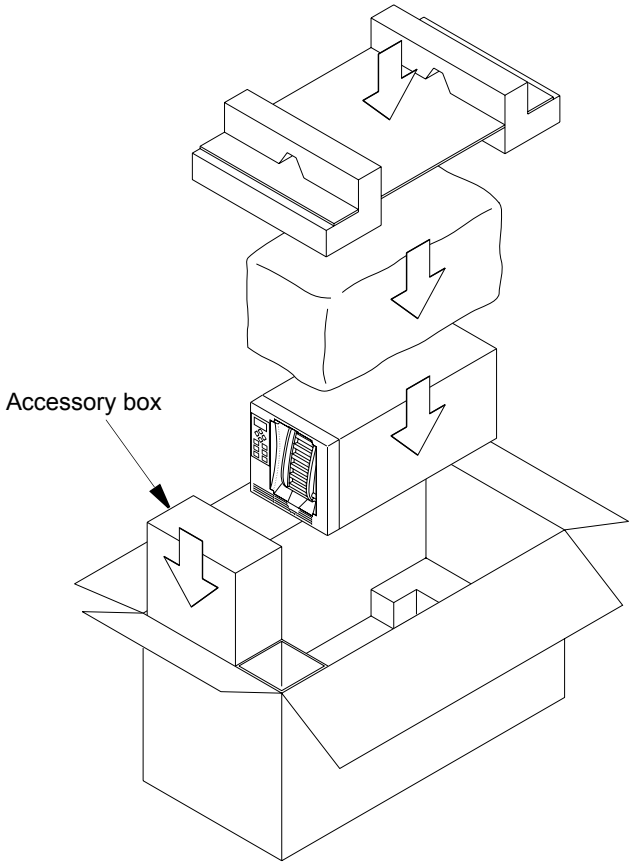


Figure 7-9 *Packing the autoloader for shipment*

4. Place the top cushion over the autoloader.
5. Place any necessary paperwork in the top of the autoloader box.
6. Close and seal the box.
7. Place the shipping label on the box.

A

SPECIFICATIONS

This appendix provides the following information about the autoloader:

- Storage capacity
- Size and weight
- Performance specifications
- Power specifications
- Environmental specifications
- Shipping specifications
- Safety and regulatory agency compliance

STORAGE CAPACITY

The storage capacity of the Exabyte VXA-2 AutoPak1x7 Autoloader varies with the model of data cartridge being used and the type of data being stored. With seven VXAtape V23 data cartridges, the autoloader has a maximum storage capacity of approximately 1.1 terabytes (TB), assuming a 2:1 compression ratio.

SIZE AND WEIGHT

Table A-1 lists the dimensions and weight of the autoloader.

Length	46.2 cm (18.3 inches)
Width	21.1 cm (8.3 inches)
Depth	21.3 cm (8.4 inches)
Weight	9.8 kg (21.5 lbs.) with the cartridge magazine and seven cartridges

PERFORMANCE SPECIFICATIONS

This section describes the following performance specifications for the autoloader:

- Data transfer rate
- Tape drive performance
- Autoloader power-on self-test time
- Move complete time
- Robot reliability

DATA TRANSFER RATE

The autoloader can achieve a data transfer rate of up to 43.2 gigabytes (GB) per hour (assuming a 2:1 compression ratio).

TAPE DRIVE PERFORMANCE

When installed in the autoloader, the tape drive performs within its specifications. For information about tape drive performance specifications, refer to the *Exabyte VXA-2 SCSI Tape Drive Product Manual*.

AUTOLOADER POWER-ON SELF-TEST TIME

Each time the autoloader is powered on, it performs a power-on self-test (POST). During POST, the autoloader:

- Performs self-diagnostics and boots up
- Moves the robot to the home position (in front of the tape drive)
- Checks for cartridges in each slot

If the cartridges are properly installed, the autoloader is ready for operation. If any cartridge is not properly installed, the autoloader reports an error and the robot returns to the home position.

The POST time is measured from the time the autoloader is powered on until it indicates ready status. The average POST time is 34 seconds.

MOVE COMPLETE TIME

Move complete time is measured from the time the autoloader receives a move command to the time the autoloader returns status indicating that the move is complete. During a move, the robot picks a cartridge from a slot or the tape drive, moves it, and places it into another slot or the tape drive.

The average move complete time for the autoloader is less than 10 seconds.

ROBOT RELIABILITY

The mean cycles between failures (MCBF) for the autoloader's robot is 500,000 cycles. This value does not include failures attributable to the tape drive, data cartridge, or the cartridge magazine.

During one full cycle, the robot completes the following actions:

- Picks a cartridge from a cartridge slot.
- Places the cartridge in the tape drive.
- Removes the cartridge from the tape drive.
- Replaces the cartridge in the cartridge slot.

POWER SPECIFICATIONS

This section describes autoloader AC input voltages and power consumption and lists the power cord specifications.

AC INPUT VOLTAGES AND POWER CONSUMPTION

The autoloader includes an internal power supply that accepts 100 VAC to 240 VAC at 50 Hz to 60 Hz. The autoloader has automatic AC input voltage selection. The autoloader is capable of continuous operation when the AC power experiences intermittent operation, voltage surges, and voltage spikes.

The power consumption of the autoloader varies depending on the function being performed. The autoloader consumes a minimum of 20 watts and a maximum of 37 watts (AC true power). Based on the AC true power consumption, the autoloader generates between 69 and 127 BTUs per hour.

POWER CORD SPECIFICATIONS

The autoloader is shipped with two power cords: One for use in the US and Canada and one for use in Europe.

The US/Canada power cord is a 2.1-meter (7-foot), three-conductor, 18 AWG power cord for 120-volt use. The power cord has a molded NEMA 5-15P male connector on one end, and a molded IEC 320/EN60320 female connector on the other end. The power cord is UL Listed and CSA Certified.

The European power cord is a 2.5-meter (8.2-foot), three-conductor power cord for 230 to 250-volt use. The power cord has a CEE 7 Standard VII, dual earthing male connector on one end, and an IEC 320 C13 female connector on the other end. The cordage is CENELEC HD-21. The power cord is VDE approved.

Requirements for International 220 VAC Power Cord

If you plan to use the autoloader in a location other than the US/Canada or Europe, you must supply a power cord that meets the following specifications:

- The power cord must have a grounded attachment plug of the proper type, rating, and safety approval for the intended country.
- The power cord must have an IEC 320/ EN63020 female connector on one end.
- The cordage must be harmonized to CENELEC publication HD-21. The electrical characteristics and rating must be minimum H05VVF3G1.00 (10 A).

ENVIRONMENTAL SPECIFICATIONS

This section describes the following environmental specifications for the autoloader:

- General environmental specifications
- Particulate contamination limits
- Acoustic noise limits
- Shock and vibration limits

GENERAL ENVIRONMENTAL SPECIFICATIONS

Table A-1 lists general environmental specifications for the autoloader.

Table A-1 *Environmental specifications*

Specification	Operating[a]	Storage[b], non-operating[c], transportation[d]
Ambient Temperature Range	+5° C to +35° C (+41° F to +95° F)	–10° C to +60° C (+14° F to +140° F)
Temperature Variation[e] (Thermal Gradient)	1° C per minute; max 10° C per hour (2° F per minute; max 18° F per hour)	1° C per minute; max 20° C per hour (2° F per minute; max 36° F per hour)
Relative Humidity	20% to 80%; Non-condensing	10% to 90%; Non-condensing
Wet Bulb	26° C (79° F) max	29° C (84° F) max
Altitude	–304.8 m to +3,048 m (–1,000 ft to +10,000 ft)	–304.8 m to +3,048 m (–1,000 ft to +10,000 ft)

[a] All operating specifications include a data cartridge. These measurements assume that the autoloader is installed in accordance with the instructions in this manual.

[b] The autoloader is in its original packaging.

[c] The autoloader has been unpacked. The packaging is designed to protect the autoloader from the condensation caused by extreme temperature variations (15° C or more). **When the autoloader is moved from a cold storage environment to a warm operating environment, it must acclimate in its packaging for at least 12 hours before opening to prevent serious condensation damage from occurring.**

[d] The autoloader has not been unpacked. The transportation period does not exceed 72 hours.

[e] The data cartridges' temperature and humidity must be allowed to stabilize in the specified ambient environment for 24 hours.

Figure A-1 is a psychrometric chart that indicates the operating temperature and humidity ranges for the autoloader. The dotted line represents the operating environment limits. Table A-2 defines the temperature and humidity points shown in Figure A-1.

Table A-2 *Temperature and humidity points for psychrometric chart*

Point	Dry Bulb Temperature	Relative Humidity
A	5° C	80%
B	29° C	80%
C	35° C	50%
D	35° C	20%
E	5° C	20%

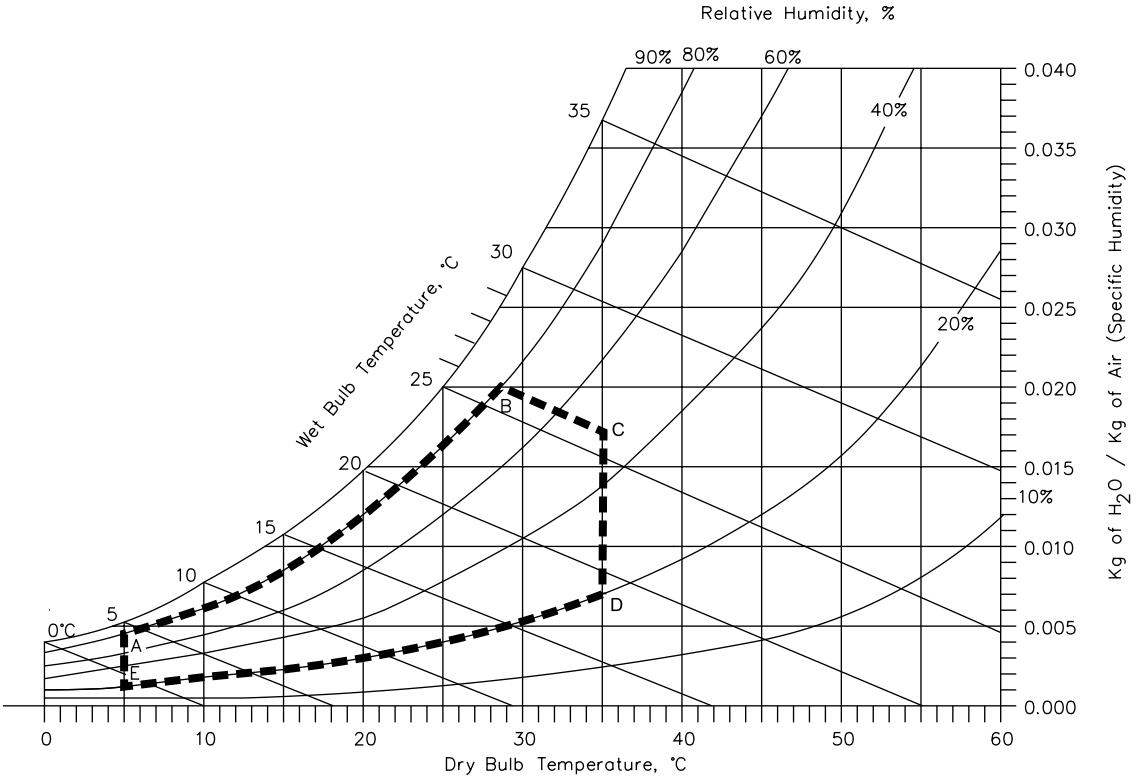


Figure A-1 *Temperature and humidity ranges for autoloader operation*

PARTICULATE CONTAMINATION LIMITS

The ambient operating environment for the autoloader should not exceed the particulate counts specified for the tape drive. For more information, refer to the *Exabyte VXA-2 SCSI Tape Drive Product Manual*.

ACOUSTIC NOISE LIMITS

The overall, averaged A-weighted sound pressure level (in decibels) for the autoloader does not exceed the upper limits specified in Table A-3.

Table A-3 *Acoustic noise limits*

Operating mode	L_{pA}[a]
The autoloader is powered on and idle; the tape drive is in streaming mode.	...TBD...
The autoloader is operational (the robot is moving); the tape drive is in streaming mode.	...TBD...

[a] L_{pA} is the average A-weighted sound pressure level over the following frequency range: 5 Hz to 12.5 KHz.

SHOCK AND VIBRATION LIMITS

The autoloader will operate normally after experiencing shock loads as specified in Table A-4. The operating shock levels indicate how much shock the autoloader can withstand while the enclosed tape drive is reading and writing data. The non-operating and storage shock levels indicate how much shock the autoloader can withstand when it is not operating. After experiencing this amount of shock, the autoloader will operate normally.

Table A-4 *Shock limits*

Operating[a]	Storage[b] or not operating[c]	Transportation[b]	Handling
3g for 5 msec[d]	30 g for 152 inches per second[e]	ISTA Project 1A	Drop and Topple per IEC 68-2-31

[a] The autoloader is unpacked and is picking and placing cartridges from the cartridge magazine and tape drive.

[b] The autoloader has not been unpacked.

[c] The autoloader has been unpacked, but no power has been applied.

[d] A minimum of 20 shock pulses were applied to each of the three orthogonal axes. The shock pulses were half-sine waves and were applied at a rate not exceeding one shock per second.

[e] A minimum of three 30 g shock pulses were applied to each of the autoloader's six sides.

Table A-5 lists the vibration specifications for the autoloader during operation, non-operation, storage, and transportation. The operating specifications indicate the amount of vibration the autoloader can withstand while the enclosed tape drive is reading and writing data.

Table A-5 *Vibration limits*

Random vibration[a] applied during operation	
1 Hz	PSD = 0.0000040 $g^{2/}$Hz
5 Hz	PSD = 0.0000270 g^2/Hz
10-150 Hz	PSD = 0.0004048 g^2/Hz
200-400 Hz	PSD = 0.0001079 g^2/Hz
Random vibration[b] applied during non-operation[c] and storage[d]	
1 Hz	PSD = 0.0003 g^2/Hz
3 Hz	PSD = 0.00055 g^2/Hz
12-100 Hz	PSD = 0.01 g^2/Hz
400 Hz	PSD = 0.000003 g^2/Hz
Transportation[d]	
ISTA Project 1A	
Swept sine applied during non-operation[e] and operating[f]	
5 to 500 to 5 Hz	

[a] A 0.3 G rms random vibration spectrum is applied to each of three orthogonal axes for a minimum of 20 minutes per axis.

[b] A 1.06 G rms random vibration spectrum is applied to each of three orthogonal axes for a minimum of 20 minutes per axis.

[c] The autoloader has been unpacked, but is not operating.

[d] The autoloader is packaged in its original shipping container.

[e] Three sweeps at one octave per minute are applied to each axis at 0.75 g (0 – peak) input.

[f] Three sweeps at one octave per minute are applied to each axis at 0.3 g (0 – peak) input.

SHIPPING SPECIFICATIONS

The autoloader's carton and internal packing pieces are designed so that the enclosed autoloader does not receive a shock greater than 30 g when the carton is dropped on any surface, corner, or edge from a height of 30 inches (76.2 cm). The autoloader's shipping carton passes the tests described in the International Safe Transit Association (ISTA) Project 1A for packaged products weighing less than 100 pounds.

Table A-6 lists the weight and dimensions of the autoloader packed in the shipping carton.

Table A-6 *Shipping weight and dimensions*

Shipping weight (carton with autoloader and all accessories)	Dimensions (length x width x depth)
31 lbs. (14 kg)	30.38 x 14.38 x 14.75 inches (77.2 x 36.5 x 37.5 cm)

Packing instructions are provided in Chapter 7. To avoid damaging the autoloader, use the original shipping carton and packing materials (or replacement packaging obtained from your vendor) when repacking and shipping the autoloader. The shipping carton and packing materials are not intended to be used for shipping items other than or in addition to an autoloader.

SAFETY AND REGULATORY AGENCY COMPLIANCE

This section describes the autoloader's compliance with safety and regulatory agency standards.

! Important To comply with the following regulations and standards, you must use shielded cables and provide adequate grounding of the SCSI bus and the input power when installing the autoloader in an office or industrial environment.

SAFETY AGENCY STANDARDS

The autoloader complies with and is certified to the applicable requirements of the following domestic and international product safety standards:

- UL Standard 1950, 3rd Edition, Information Technology Equipment including Electrical Business Equipment
- CSA Standard C22.2 No. 950-95, Safety of Information Technology Equipment including Electrical Business Equipment
- EN 60950:2000, Safety of Information Technology Equipment including Electrical Business Equipment

RADIATED AND CONDUCTED RADIO FREQUENCY EMISSIONS (EMI)

The autoloader meets the requirements for radiated and conducted emissions as defined by the following standards:

- FCC Rules and Regulations, Part 15, Class B: Radio Frequency Devices, Subpart B: Unintentional Radiators

! Important According to FCC regulations, changes or modifications to the autoloader that are not expressly approved by Exabyte may void the user's authority to operate the autoloader.

- Industry Canada Notice, ICES-003, Class B, Digital Apparatus
- CISPR Publication 22, 1987 (EN 55022), Class B
- VCCI Class 2 (Japan)

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY

The autoloader complies with EN 61000-4-2:1995, Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques, Part 2: Electrostatic Discharge (ESD) Immunity.

Exabyte has extended testing as follows:

- Up to 12,000 volts air discharge applied to all non-metallic surfaces
- Up to 8,000 volts direct discharge applied to all metallic/conductive surfaces

In each case, there is no degradation or non-recoverable loss of function due to damage of equipment or firmware.

RADIATED RADIO FREQUENCY FIELD IMMUNITY

The autoloader complies with EN 61000-4-3:1996 and ENV 50204:1995, Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques, Part 3: Radiated Radio-Frequency Immunity.

The autoloader will continue to operate without error while being exposed to an electromagnetic field of 3V/m.

ELECTRICAL FAST TRANSIENT (EFT)/BURST IMMUNITY

The autoloader complies with EN 61000-4-4:1995, Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques, Part 4: Electrical Fast Transient/Burst Immunity.

The autoloader will continue to operate without error when exposed to EFT of ±1,000 V on the AC power ports and ±500 V on the I/O ports (SCSI connectors and serial port).

SURGE IMMUNITY

The autoloader complies with EN 61000-4-5:1995, Electromagnetic Compatibility (EMC), Part 5: Surge Immunity.

The autoloader will continue to operate without error after being subjected to surges to ±2,000 V.

CONDUCTED RADIO FREQUENCY FIELD IMMUNITY

The autoloader complies with EN 61000-4-6:1996, Electromagnetic Compatibility (EMC), Part 6: Conducted Radio Frequency Immunity.

The autoloader will continue to operate without error while being exposed to a field of 3Vrms.

VOLTAGE DIPS, INTERRUPTIONS, AND VARIATIONS IMMUNITY

The autoloader complies with EN 61000-4-11:1994, Electromagnetic Compatibility (EMC), Part 11: Voltage Dips, Short Interruptions, and Voltage Variations Immunity.

The autoloader will continue to operate without error after being exposed to a 30% voltage dip for 500 ms. The autoloader will be self-recoverable or can be restored by the operator after being exposed to a 95% voltage dip for 10 ms and after an interruption of 5 seconds.

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